THE IRON TRADE REVIEW

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THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

The iron trade enters upon the second half of 1902 with prospects fully as bright as when the year opened, with consumption greater and prices higher. At the beginning of the year there was the serious hampering of insufficient railroad facilities. Pig iron production has increased in the six months, being about 200,000 tons a month greater on June 1 than on Jan. 1, but still consumption outruns production, which is now restricted by labor troubles. With every nerve strained in these six months the iron trade has been unable to cope with the demands of a phenomenal prosperity. In the past week the coke shortage has been more of a factor. Eastern Pennsylvania and Southern Ohio furnaces affected by coal strikes, are still inactive, and Virginia furnaces are feeling the shortage. Shenandoah, Alleghany and Low Moor are banked, and several Tennessee furnaces are running with less than their usual supply of coke. In the Birmingham district the settlement with the coal miners for the year beginning July 1 has brought a strike and four furnaces are banked. Steel works and rolling mill scales cause no cessation of work, amicable adjustments being made, but a number of mills including those of the Republic Iron & Steel Co. will be idle for two weeks for needed repairs. The labor situation shows some unrest outside of the miners' struggle, railroad machinists and boiler makers in the West having made demands that are still unadjusted. Naturally quiet at this time in a number of lines the iron trade gives no evidence that consumption is lagging. New inquiry in pig iron has come up in very considerable volume. Furnaces have not encouraged contracting for the new year, and this has rather stimulated the interest of some buyers who recall the attempts of some Southern furnaces to stave off buying early in the year, with results that to some buyers were not pleasant. The largest negotiations in pig iron for 1903 are in the Chicago district, one agricultural implement firm having asked bids on about 25,000 tons. But relatively little iron has been taken for next year in the past week. For this year there is still considerable inquiry and not a great deal of iron. The scarcity seems most pronounced in the East, where Middlesboro and Scotch irons are much sought even at the recent advance. May imports of pig iron were about 30,000 tons, but this includes ferro-manganese and spiegel and is not enough to offset strike effects. Prices are advancing for spot foundry iron, but have not changed for next year's deliveries, Northern furnaces generally asking from $20.50 to $21 at furnace for 1903 iron. The steel situation is eased a trifle by the shut down of finishing mills. A 10,000-ton sale of billets, half foreign and half domestic, was made in the Pittsburg district, German billets bringing $32.50 and domestic, $34. Foreign billets are firmer in the Chicago district, a recent quotation being $33. Finished material is still being hurried into consumption at the pace of recent months. Bars show the only noticeable tendency to weaken and that only on smaller size, large sizes being exceedingly scarce. In the Chicago district the heaviest tonnage of structural material in weeks has been closed, the buying being stimulated presumably by the announcement of an advance by a Central Western mill. In the neighborhood of 40,000 tons is involved in the contracts, which include steel for the First National Bank Building and other structures.

LATER.—Advices from the Birmingham District are that 11,000 coal miners are out, only the Woodward Iron Co.'s mines being in operation, and these under a special 30-day contract. Four blast furnaces are already banked. The miners demand eight hours and a fortnightly payday. The operators contend for the old scale without change. Both sides are firm and a long struggle is expected.

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
429 PARK BUILDING, July 2.

There have been no deals of significance in the iron and steel trade during the past week, and there is every indication that the buying will be limited during this and next month, owing to the fact that consumers are nearly covered until the end of the year. The pressure on the plate, structural and rail mills continues and all of the large producers are months behind on their deliveries. The shutting down of many of the large finishing mills will temporarily relieve the scarcity of steel and will enable the plate, structural and rail mills to produce better tonnages.

The scarcity of coke is again proving a prominent factor in keeping down the production of pig iron. In the Mahoning and Shenango Valleys the furnaces are not producing their full tonnages, and a portion of the production of the Connellsville region is going to the East. Spot furnace coke commands from $3 to $3.50 and sales of carload lots have been reported as high as $4. The production in both the upper and lower Connellsville regions is greater than ever before, but the output is still many thousands of tons short of the demand.

This week the mills of the National Tube Co., American Tin Plate Co. and the American Sheet Steel Co. were closed pretty generally and will remain idle for a period of two weeks, during which time repairs are to be made. Some of the mills of the American Steel & Wire Co. have also closed down. The Carnegie Steel Co., the National Steel Co. and the American Steel Hoop Co.'s plants will continue in operation, while Jones & Laughlins, Ltd., will also keep in operation. Many of the smaller independent plants throughout this district have also closed down for brief periods, but in all cases operations will be resumed as soon as the necessary repairs can be made.

Nor does the labor situation threaten disturbances. The scales of all the companies of the United States Steel Corporation have been signed with the Amalgamated Association, while nearly all of the independent manufacturers having Amalgamated men in their employ have already signed for the ensuing year. The machinists who threatened trouble on the 10th of this month have settled their differences with the shops in this district while the last vestige of the trouble with the coremakers is disappearing.

The six months period which has just come to a close has seen a remarkable advance in iron and steel products generally. Bessemer iron has advanced about $5 per ton while the advance in No. 2 foundry iron amounts to about $6.50. Gray forge has advanced about $5 and basic $6. Bessemer billets have risen $7 and wire rods about $3. On the other hand plates, structural material, sheets, tin plate and wire products have been held on a level. Steel bars have been advanced $2 per ton and iron bars have advanced $6. It can be seen that finished materials have not advanced proportionately to raw material and in many instances at present the finished product is selling for less than steel billets. The influence of all the large producers has been in the direction of uniform prices but so great has been the demand for all kinds of products that the eagerness of the consumers has resulted in an ad-

vancing market. It is the general belief that the market will not go much above the present quotations except in isolated cases, as further advances would no doubt result in cutting off buying for a time at least.

PIG IRON.—There has been practically no buying of Bessemer during the week and furnaces are at present concerned only in the delivery of the iron on contracts closed during the past three months. In nearly every case deliveries are from one to two months behind and with the furnaces operating as they are at present, there is little indication that they will catch up on their deliveries in the next two months. There is considerable buying of foundry iron in small lots for prompt delivery and on special brands furnaces are securing as high as $23 and $23.50. For delivery through the remainder of the year, however, we note the sale of 2,000 tons at $22.50 and there have been sales of round lots for delivery the first half of next year at $21.50. We also note the sale of 1,500 tons of forge for delivery during the next three months at $20.50, Pittsburg. We make the following quotations:

Bessemer, Valley	$21 00 to 21 50
Bessemer, Pittsburg	21 75 to 22 25
No. 1 Foundry	23 50 to 23 50
No. 2 Foundry	23 50 to 23 00
No. 3 Foundry	21 25 to 21 75
Gray Forge, Pittsburg	20 50 to 20 75
Chilled Basic, Valley	20 25 to 21 00
Chilled Basic, Pittsburg	21 50 to 21 75

STEEL.—One large independent steel interest in this city placed in the past week orders for 10,000 tons of Bessemer billets, for delivery to Oct. 1. Half of the order was placed with German producers and the remainder went to domestic steel producers. The price on the domestic product was $34 a ton while the foreign was placed at $32.50. Bessemer rods are quoted at $36 to $37, with practically no buying.

FERRO-MANGANESE.—Owing to the recent heavy buying of manganese by consumers in this district there have been practically no transactions during the week. No domestic ferro is being offered at the present time and there is no indication that the production will be resumed at an early date. English ferro is held at $52.50, delivered anywhere in this country, while the German product is quoted at $52.25 per ton.

RAILS AND TRACK MATERIAL.—There have been no additional large orders of rails during the past week for delivery next year although some large contracts are pending. We make the following quotations: Standard sections, 50 pounds and over, in lots of 200 tons and over, $28; car lots and less than 200 tons, $30; less than car lots, $32; light rails, 8 pounds, $45; 12 pounds, $42; 16 pounds, $39; 20 pounds, $37; 25 to 40 pounds, $34 to $36. Track material: Spikes, 2c to 2.05c; track bolts, square heads, 2.50c; hexagon heads, 2.65c; fish plates, 1.60c.

MUCK BAR.—Eastern mills are beginning to offer their product in this market somewhat below quotations of local producers with the result that prices are somewhat easier. Eastern mills are offering their product at $35 per ton while local mills are asking $36 to $36.50.

SKELP.—Iron skelp is also being shipped here from the East and we note the sale of 500 tons at 2.05c, while local mills are holding their product at 2.22½c. Steel skelp is held nominally at 2.25c.

SPELTER.—There has been no decline in the spelter market and prime Western grades are held at 4.75c to 4.80c, Pittsburg.

PLATES.—None of the local mills can promise deliveries on large orders of plates short of the first of the year. Small lots for prompt shipment are held at 1.85c to 2c, while the Eastern mills ask 2c for Eastern delivery. We make the following quotations: Tank plates, ¼-inch thick and up to 100 inches in width, 1.60c at mill, Pittsburg; flange and boiler steel, 1.70c; marine, ordinary firebox, A. B. M. A. specifications, 1.80c; still bottom steel, 1.80c; locomotive firebox, not less than 2.10c, and it ranges in price to 3c. Plate more than 100 inches wide, 5c extra 100 pounds. Plates 3-16 of an inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra. These quotations are based on carload lots, with 5 cents extra a hundred pounds for less than carload lots. Terms, net cash, in 30 days.

BARS.—New business in steel bars is limited to small lots only and for prompt delivery premiums of $2 to $3 per ton continue to be asked. Quotations on future deliveries are as follows: Bessemer steel bars, 1.60c; open-hearth, 1.70c; plow beams and cultivator beams, 1.60c, net; channels, angles, zees and tees, Bessemer under 3 inches, 1.70c; over 3 inches, 1.80c; bar iron, 1.80c to 1.90c, Pittsburg, with full freight added to point of delivery. Hoops and bands are quoted at 1.90c, full extras, in 250-ton lots and over, and 2c in less than 250-ton lots; refined iron bars, 2.25c and upwards.

PIPES AND TUBES.—The volume of new business continues good and the mills continue to experience much difficulty in making prompt deliveries. Quotations to jobbers in carload lots, with freight added to destination, are as follows:

MERCHANT PIPE.

	Black. Per cent.	Galv. Per cent
⅛ to ⅜ and 11 to 12 inches	60	48
½ to 12 inches	67	55

Discounts to consumers in carload lots, Pittsburg, are as follows:

BOILER TUBES.

Steel.

	Per cent.
1 to 1¼ inches	42½
2¼ to 5 inches	61
1¾ to 2¼ and 6 to 13 inches	55½

Iron.

	Per cent.
1 to 1¼ inches	39
2¼ to 5 inches	48
1¾ to 2¼ and 6 to 13 inches	38

CASING.

	S. and S. Per cent.
2 to 3 inches	58
3½ to 4 inches	60
4½ to 12½ inches	63

SHEETS.—With the majority of the mills of the American Sheet Steel Co. closed during the next two weeks the production of sheets will be greatly curtailed and it is probable that the softness which is felt at present will entirely disappear. The market on galvanized sheets is also somewhat easier but no changes in quotations have yet been reported. Carload lots to consumers are quoted as follows: Nos. 10 and 12, 2.40c to 2.50c; 14 and 15, 2.50c to 2.60c; 16, 2.60c; 18 and 20, 2.70c to 2.80c; 22 and 24, 2.80c to 2.90c; 26, 2.90c to 3c; 27, 3c to 3.10c; 28, 3.10c to 3.20c; 29, 3.25c to 3.35c; 30, 3.35c to 3.45c. Galvanized sheets, in carload lots to consumers, are quoted at 3.05c for Nos. 10 and 11, 3.45c for Nos. 18 to 21, 4.20c for No. 27, and 4.50c for No. 28. Galvanized sheets, mill shipments in carload lots to consumers are as follows: Nos. 10 and 11, 3.05c; Nos. 12 to 14, 3.15c; Nos. 15 to 17, 3.25c; Nos. 18 to 21, 3.45c; Nos. 22 to 24, 3.75c; Nos. 25 and 26, 4c; No. 27, 4.25c; No. 28, 4.50c.

STRUCTURAL MATERIAL.—Local deals have been wanting the past week, though a good tonnage has come to the mills from the West. Trading for Pittsburg consumption has been limited to small lots only by the merchants handling this material from the warehouse. For prompt delivery as high as 3c is asked. Pool quotations are as follows: Beams and channels, 3 to 15 inches, 1.60c; 18 to 24 inches, 1.70c; tees, 1.65c; zees, 1.60c; angles from 3 to 6 inches, 1.60c; universal mill plates, 1.60c.

WIRE AND WIRE NAILS.—No changes have been made in the prices of either wire or cut nails. A fair amount of business is being offered but not nearly enough to satisfy all the mills. Our quotations are as follows: Wire nails in carload lots, $2.05 per keg; smaller lots, $2.10 and $2.15; plain wire, $2 in carload lots and $2.10 in less than carload lots to retailers; galvanized wire, $2.40 in carload lots; polished staples, $2.20, and galvanized staples, $2.60; painted barb wire, $2.60, and galvanized, $2.90. These prices are quoted on a Pittsburg base, plus the actual freight to destination. Cut nails are held at $2.05 in carload lots and $2.10 in less than carload lots, Pittsburg, plus freight to destination.

MERCHANT STEEL.—The demand for shafting is exceedingly heavy, many of the users of hot rolled material purchasing the cold rolled product on account of the scarcity of the former. One of the large shafting manufacturers has contracts on his books for the next three months. The buying of machinery steel is also reported heavy. We make the following quotations: Turned, cold rolled ground shafting in carload lots is quoted 50 off, and in less than carload lots, 45 off; tire steel, 1.80c in carload lots and 2c less than carload lots; toe calk, 2.10c to 2.25c; sleigh shoes, 2.10c to 2.25c; machinery steel, 1.70c; smooth machinery steel, 1.75c. Tool steel, 7 cents and upwards.

OLD MATERIAL.—During the past week a large tonnage of heavy melting stock was exchanged for pig iron, the material in no way affecting the price of the melting stock which con-

tinues to be quoted at $21.50 per gross ton. The scrap market continues quiet and our quotations, gross tons, are as follows: Car wheels, $21 to $21.50; steel rails, mixed lengths, $21: rerolling lengths, $23 to $23.50; relaying rails, $27 to $29 and $30; old iron rails, $27; No. 1 cast scrap, $18.50 to $18.75; wrought turning, $13.50 to $14.

COKE.—Furnace coke for spot shipment is commanding fancy prices and sales of carload lots have been reported at $4 a ton at the oven. Larger lots are being sold to Eastern furnaces, and to Ohio furnaces whose Pocahontas supply is cut off, at $3.50 per ton. Contracts for non-Connellsville furnace coke for delivery the remainder of the year have been made at $2.25 and foundry at $2.75. For future delivery Connellsville furnace coke is held at $2.25 and foundry at $2.75 and $3. The production of the upper and lower Connellsville region for the week ending Saturday, June 21, was within a few tons of 285,000, and the production of both regions this year will be several million tons greater than last year's output if the present record is continued.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
519 MONADNOCK BLOCK, June 30.

Greater activity is displayed in the Western markets than at any time in months. The activity is largely in inquiries that as yet are unsatisfied, but that have all the ear marks of genuineness. One of the local implement makers has asked prices on several grades of pig iron, for deliveries extending from December 15 to May 1, the total aggregating 23,000 to 28,000 tons. This is the largest individual inquiry, but there is a considerable number of others, though for relatively small tonnages. And what is of perhaps more significance, the total buying during the past week has probably exceeded the amount of the present inquiries. Most of this business has been for the first quarter or half of next year, though the last quarter of 1902 has secured some tonnage. There has been also brisk buying in structural shapes. This may have been precipitated by the announcement of one Pittsburg maker that prices have advanced from 1.75 to 2c. The advance was not followed by the largest producers, but the fear of a possible advance here sent many users and intermediate dealers into the market. As a result the tonnage booked was anywhere from 30,000 to 60,000 tons, a heavier week's trading than in many months. Moreover the plate trade received a substantial recognition from users and the rail business maintains its activity. Against this activity some apprehensions regarding the coming corn crop in Illinois and Iowa and perhaps other Western States are expressed as possible checks to consumption later in the year. This apprehension found expression in board of trade quotations but is too remote to affect present iron and steel markets. The usual report is that specifications on finished products on old contracts are wholly satisfactory in volume and in promptness.

PIG IRON.—The size of premiums for spot iron are variable to an unusual degree, circumstances determining in almost every instance. In the exceptional case the price may be only 50 cents above the quotation for future deliveries. More likely it will be $1, $2 or even a still wider margin. There has been a fair amount of iron offered, but it has been concentrated in very few hands. The Thomas Furnace at Milwaukee, which has been selling for prompt shipments, will, it is said, run on malleable Bessemer this month and this will take quite a tonnage of spot foundry iron out of the market. The Duluth Furnace also, it is said, will make malleable. The buying for the past week has been widely distributed both as regards buyers and the grades of metal. There have been fairly good transactions in malleable pig iron, foundry and mill. This iron is wanted for the last quarter of the year or for the first quarter of 1903 and the total makes the best week's trading for months. If the rule holds that an inquiry from the large implement makers is followed by an extensive buying from the lesser users, then there is good chance of further activity ahead, for one of the Chicago implement makers has asked for 23,000 to 28,000 tons of iron. The tonnage of local iron in the market is not large and with Southern product it is largely a matter of price, which is unsettled. Some iron is being sold on the basis of $17 to $18, Birmingham, though one of the largest producers is as yet not offering anything for 1903 delivery. Prices follow:

Lake Sup. Charcoal	$23 50	to $24 00	Southern Coke No. 4	$ 0 15	to $ 0 65
Local Coke Fdy. No. 1	22 00	to 23 50	Southern No. 1 Soft	21 65	to 22 15
Local Coke Fdy. No 2	21 00	to 22 50	Southern No. 2 Soft	20 65	to 21 15
Local Coke Fdy. No. 3	20 00	to 21 50	Southern Gray Forge	20 15	to 20 65
Local ScotchFdy.No.1	21 00	to 22 50	Southern Silveries	22 15	to 23 15
Local ScotchFdy.No.2	20 50	to 22 00	Jackson Co. Silveries	24 50	to 25 50
Southern Coke No. 1	21 65	to 22 15	Ohio StrongSofteners	24 10	to 24 60
Southern Coke No. 2	21 15	to 21 65	Alabama Car Wheel	24 65	to 25 10
Southern Coke No. 3	21 65	to 22 15	Malleable Bessemer	22 50	to 23 50

BARS.—In a small way the trade in bars has picked up quite noticeably during the past week, both in steel and iron. Small sizes, which are the product of the continuous mills are fully equal to current demands, but the larger sizes are scarce. The mills of the Republic Iron & Steel Co. all closed down last Saturday, some for a week and some for two weeks, the length of the idleness depending upon the extent of repairs necessary. Bar materials now purchased is wanted mainly for extended deliveries. One large consumer, who has bought for needs up to January, 1903, is now negotiating for his wants through the whole of the calendar year 1903. The tone of the market is steady. We quote Chicago delivery, Bessemer steel, 1.75c to 1.85c; angles, less than 3x3, 1.85c; iron, 1.75c to 1.85c; hoops, 2.15c. Prices out of store: steel, 2c to 2.10c; iron, 2.15c to 2.25c; hoops, 2.40c to 2.45c; angles, 2.50c to 2.60c.

SHEETS.—There is no change in the situation. Offerings are large and there is some wavering of quotation, but the market as a whole is steady. We quote No. 27 black, mill shipments, Chicago delivery, 3.15c to 3.25c; galvanized, 4.40c to 4.50c; out of store, No. 27 black, 3.45c to 3.55c; galvanized, 4.70c to 4.80c.

STRUCTURAL MATERIAL.—The contract for the shapes for the First National Bank building of Chicago was closed this week. Other business booked aggregated a heavy volume and there are pending still other contracts of magnitude. The present activity is quite exceptional. The buying is by all classes of consumers. It includes buildings, car requirements, bridge material and the stock of large intermediate sellers. The advance in quotations from mill by one maker to 2c is the supposed cause for the special buying movement, or it has at least aided the demand. We quote mill prices as follows: Beams, 15 inches and under, 1.75c; 18 inches and over, 1.85c; structural angles, 3x3 to 6x6, 1.85c; angles, channels and tees, smaller than 3 inches, 1.85c base; plates, 1.75c. Prices on lots from store are based on the necessities of buyers and according to the size of order. Store prices vary from 2½ to 4 cents a pound.

BILLETS.—There are pending some new negotiations for foreign billets. It is said that the quotation made on a 5,000 ton lot for a Western consumer, who a few weeks ago bought 5,000 tons as a starter, is $33, a fractional advance from the former transaction. Local open hearth billets are held at $37 to $38, with a good demand.

RAILS AND TRACK SUPPLIES.—The exact extent of the rail buying in this market during the past week or two can only be guessed at as figures are not obtainable. But from indications there is a steady sale to large buyers for next season's wants. Prices are firm. We quote standard rails, $28; second quality, $27; light rails, 45 pounds, $34 to $35; 12 pounds, $40 to $41 with regular differentials for intermediate sizes; out of store, $45 to $50; splice bars, 2.25c; spikes, carload lots, 2.45c to 2.55c; track bolts 3½x3¼, with square nuts, 2.85c per 100 pounds; with hexagon nuts, $3, with usual differentials for other sizes.

MERCHANT STEEL.—Specifications this week are not so large. This quieting down of demand is a relief to the over-worked mills, that are now about sixty days behind in their orders. The passing away of the old year is perhaps accountable in part for the lightness of inquiry. We quote mill shipments, Chicago delivery, as follows: Smooth finished tire steel, 1.95c to 2c; open hearth spring steel, 2.65c to 2.75c; sleigh shoe, 1.75c to 1.80c, flat sizes; concave and convex, 2c; out of store, 2.15c; cutter shoe, 2.40c to 2.60c; machinery steel, 2.15c to 2.25c, base; plow steel, 2.50c and upwards, according to quality; toe calk, 2.25c to 2.35c; out of stock, 3c to 3.10c; ordinary tool steel, 6c to 7c; specials, 13c and upwards; less than carload lots, 5 percent to 10 percent higher, cold rolled shafting, carload lots, 50 percent off, Chicago; less than carload lots, 45 percent off, Chicago.

CAST IRON PIPE.—Demand for cast iron pipe is seasonably good and there is a steadiness to quotations, which are based on $34, car loads for 4-inch water pipe.

MERCHANT PIPE.—Trade is of a comfortable quality, but without anything unusual in the demand. Prices are as follows:

MERCHANT PIPE, RANDOM LENGTHS.

	Black Per cent.	Galv. Per cent.
⅛ to ⅜ in.	58	45
¼ to 12 in.	65	52

BOILER TUBES.

Steel.

	Per cent.
to 1¼ in.	35
1¾ to 2½ in.	45
2¾ to 5 in.	55
6 to 13 in.	47½

Iron.

	Per cent
¼ to 1¼ in.	35
1¾ to 2½ in.	32½
2¾ to 5 in.	42½

PLATES.—The closing of the contracts for ten lake vessels will give additional work to the mills of South Chicago, which are already sold up well through the year. The market is strong. We quote mill prices, Chicago delivery: Tank steel, ¼-inch and heavier, 1.75c to 2.15c; flange steel, ¼-inch and heavier, 1.85c to 2.25c; from stock, tank steel, ¼-inch and heavier, 2.20c to 2.35c; 3-16, 2.30c to 2.45c; No. 8, 2.35c to 2.55c; flange steel, 2.35c to 2.50c.

WIRE AND WIRE NAILS.—This is inventory season throughout the Southern territory and consequently inquiry from that region is now light. And while the aggregate volume of business shows the natural summer quiet, it is somewhat significant that no mills are known to be offering product below the regular quotations, which may thus be said to be quite steady. We quote as follows: Smooth wire carloads, $2.15; painted barb wire, $2.75; galvanized barb wire in carload lots, $3.05; wire nails, carload lots, $2.20; staples, carload lots, $2.30; jobbers' prices to retailers, 5 cents higher than above for carload lots, and 10 cents higher for less than carload lots.

COKE.—There is no decrease in the inquiry for coke. Nor are receipts showing improvement. The market has a good strong appearance at the recent rise in prices. We quote 72-hour Connellsville foundry, $5.75; for spot delivery, $6.00; Virginia and West Virginia coke, $5.25 to $5.50.

OLD MATERIAL.—This week no weakening of values in old material are discernible. There is not much trading and the stocks seem to be coming into the centers of distribution with greater volume, but there is a strong undertone. We quote gross tons as follws:

Old iron rails	$24 00 to $25 00	Relaying rails	31 00 to 31 00
Old steel rails, long lengths	23 00 to 24 00	Old wheels	20 00 to 21 00
Old steel rails, short lengths	18 00 to 19 00	Heavy melting steel	19 00 to 20 00
		Mixed country steel	14 50 to 15 00

The following are selling prices per net ton:

No. 1 R. R. wrought	$20 50 to $21 50	Steel axles	$20 00 to $21 00
No. 2 R. R. wrought	19 00 to 20 00	Cast borings	9 50 to 10 00
Dealers' forge	15 50 to 16 00	Wrought turnings	13 00 to 13 50
No. 1 busheling	13 50 to 14 00	Iron axle turnings	13 50 to 14 00
No 1 R. R. & mch. cast	14 25 to 14 75	Steel axle turnings	13 00 to 13 50
Railway Malleable	15 50 to 16 50	Stove plates	11 00 to 11 50
Country malleable	13 50 to 14 50	Old iron splice bars	21 00 to 21 50
Iron axles	24 50 to 25 00		

R. E. Belknap, formerly of Harrisburg, Pa., has been appointed assistant to Clifford J. Ellis, sales agent of the Pennsylvania Steel Co. at Chicago.

CLEVELAND.

OFFICE OF *The Iron Trade Review*, 1064 ROSE BUILDING, July 2.

PIG IRON.—The inquiry for iron for 1903 continues, but there has been little buying for such delivery in the past week. Furnaces are not seeking business for next year and as a rule prefer to postpone consideration of it for another month or two. Foundries taking contracts by the year, beginning with July 1, want to know their pig iron cost for the second half of the contract period. Some are willing to wait until early fall to cover, believing that the top has been reached; others, with the present scarcity so marked and mindful of the interruptions to furnace operations from one cause and another since the first of the year, are seeking to cover in part. There is some iron available for the latter part of this year, and on this buyer and seller get together, generally at the latter's terms. For No. 2 foundry $18 and $18.50 at Southern furnace is paid for 1902 iron; Northern furnaces are selling for this year's delivery at from $21.50 to $22.50 for No. 2 at furnace. The situation in forge iron will be relieved slightly by the shut-downs of the mills. Meantime $20 to $20.50 at furnace is about the range. Bessemer iron is very quiet and is likely to be inactive for some time. We quote the Cleveland market as follows:

Bessemer	$21 75 to $22 25	Scotch No. 1	$21 75 to $22 75
No. 1 Strong F'dry	21 75 to 22 75	Scotch No. 2	21 25 to 22 25
No. 2 Strong F'dry	21 75 to 22 25	Gray forge, Valley	20 00 to 20 50
No. 3 Foundry	20 75 to 21 75	LakeSuperior charc'l	23 00 to 24 00

FINISHED MATERIAL.—The mills of the Republic Iron & Steel Co. are to be shut down for two weeks, or until July 14. In Cleveland the Union Rolling Mill Co.'s plant will probably be idle through July, extensive improvements being under way. The Empire Rolling Mill Co. will be closed down for 10 days. The situation in bars shows even more difficulty in getting larger sizes, large rounds being practically unobtainable. In smaller sizes, both of steel and iron, there is no stringency and occasional evidences of easier prices appear. We continue to quote bar iron at 1.80c, Pittsburg, and steel bars, delivery in 60 to 90 days, 1.60c to 1.70c, Pittsburg. Sales out of stock, Cleveland, are on the basis of 1.90c to 2c. The plate market is active and firm, a premium of $3 a ton being obtained for deliveries this year. Recent vessel business has given the mills a large tonnage, and the American Shipbuilding Co.'s yards are now said to be supplied with work for the coming winter. Independent shipyards are also buyers, and bridge and boiler works tonnage is above the average. The range of prices is 1.70c to 1.85c, Cleveland, for tank according to deliveries. A good demand appears for sheets, with mills able to make better deliveries on galvanized than on black. In some cases premiums are paid to get prompt deliveries. We quote 2.10c to 2.15c Cleveland for 3-16-inch and heavier and 2.25c Cleveland for No. 8. Cleveland prices continue on the following basis on mill sales of black sheets: No. 24, 2.90c to 3c; No. 26, 3c to 3.10c; No. 27, 3.10c to 3.20c; and the following prices out of stock: No. 10, 2.35c to 2.50c; No. 12, 2.45c to 2.60c; No. 14, 2.55c to 2.70c; No. 16, 2.95c to 3c; No. 18, 3c to 3.15c; No. 20, 3.05c to 3.20c; Nos. 22-24, 3.15c to 3.30c; Nos. 22-26, 3.25c to 3.40c; No. 27, 3.35c to 3.50c; No. 28, 3.45c to 3.60c, for one pass cold rolled. For full rolled .10c extra is charged. On galvanized sheets Cleveland prices to consumers are as follows for carload lots: Nos. 10 and 11, 3.15c; Nos. 12 to 14, 3.25c; Nos. 18 to 21, 3.55c; Nos. 22 to 24, 3.85c; No. 27, 4.35c; No. 28, 4.60c. The situation in structural material continues strong. The scarcity of angles is more acute and sellers can virtually name their prices. The business from stock in structural shapes is large and 2½c to 3c is paid for beams and channels in small lots.

OLD MATERIAL.—The general shut down of the mills for repairs has caused some diminution in demand for rolling mill material. Some dealers are talking of general higher prices, but it is doubtful if they will prevail. Foundry scrap is firmly held. We quote the Cleveland market, all gross tons, as follows:

Old iron rails	$ 26 00 to 27 00
Old steel rails (6 ft. and over)	22 00 to 23 00
Old steel rails (6 ft. and under)	19 00 to 20 00
Old car wheels	18 00 to 19 50
No. 1 R. R. wrought scrap	21 50 to 22 00
Mill scrap	20 00 to 20 50
No. 1 machine cast scrap	17 50 to 18 50
Iron axles	28 00 to 29 00
Axle turnings	18 00 to 18 50
Wrought turnings (free from cast)	14 00 to 14 50
Cast borings	9 50 to 10 50
Uncut wrought iron boilers	11 00 to 12 00
Steel boiler plates	16 00 to 17 00
Grate bars	11 50 to 12 50
Pipes and flues (clean)	17 00 to 18 00
Tank iron	17 00 to 18 00
Hoop and band iron	13 50 to 14 50
Sheet iron	11 50 to 12 00
Wrought drillings	13 00 to 13 50
Malleable iron	17 00 to 18 00
Stove plate	13 00 to 14 00
Heavy steel	18 50 to 19 50

CINCINNATI.

July 1.

The seriousness of a strike situation is interesting the iron trade more than anything else. The report that the coal miners are going out in the Birmingham district is received with a great deal of concern. This would cut off about the only supply of pig iron that has been heretofore counted as rather free from trouble and the results would be far reaching. There has been no halt in the iron business up to this time even in the face of the situation in the East, save, of course, the continued shortage of pig iron for immediate delivery. As for the sale

of finished material, the demand has kept up and new business has shown no signs of falling off. It is therefore all the more disappointing at this time that trouble should threaten the South which was looked upon as likely to be called on for as much iron as could be made by all the furnaces running full.

PIG IRON.—There has been a steady inquiry for pig iron though the aggregate of the tonnage sold has been light. Iron sold for early shipment has been entirely of small or odd lots and all sorts of prices have been secured, depending, as one large iron handler said, on the furnaceman's conscience to a great extent as to whether he would take advantage of the situation to give the consumer a little squeeze. The prices for immediate delivery would seem to indicate that the furnacemen with iron have had little conscience while the furnaceman with consciences have had little iron.

The calls for iron for delivery during the last quarter of the present year and the first quarter of next year have been coming in steadily. The price on this iron has been from $17 to $18 for No. 2, Birmingham. Some furnaces have sold as high as $18.50. The business is almost all for foundry irons in the general run of trade. A few large lots have been sold, the Chicago branch of a large Cincinnati pig iron firm having sold 10,000 tons of foundry grades deliverable during the first six months of 1903. Other orders have run along about 500 to 1,000 tons. Some of the large Southern producers have been discouraging sales for delivery during 1903. There is really very little iron to be had during the remainder of this year and on the other hand buyers are pretty well covered until Jan. 1. Prices at Cincinnati are as follows:

Southern Fdy. No. 1	$20 75 to 21 75	Gray Forge	$19 00 to 20 00
" " 2	20 25 to 21 25	Northern Fdy. No. 1	24 10 to 24 60
" " 3	19 75 to 20 75	" " 2	23 60 to 24 10
" " 4	19 25 to 20 25	Southern C. W. iron	25 25 to 25 75
So. Fdy. No. 1 soft	20 75 to 21 75	Malleable coke iron	22 75 to 23 50
So. Fdy. No. 2 soft	19 75 to 20 75		

FINISHED MATERIAL.—All kinds of finished material are in good demand. The agricultural implement manufacturers are now coming into the market for bars and shapes and the makers of safes and of a general run of articles that have no seasons are buying liberally of sheets, plates and angles, though they are getting anything but good deliveries. On bars manufacturers are promising delivery in a few weeks' time, but on plates they are making no promises at all. Structural material is about the same as to deliveries, numerous building operations in Cincinnati proper and in the surrounding territory having been postponed on account of the trouble in getting material. Business continues to be very good. One large local iron store reports that its business for June was six times what it was in June a year ago. There are no changes in prices from the last report, bar iron remaining at 1.92c and bar steel at 1.72c, both iron and steel bars being quoted at 2.20c out of store. Angles are 2.35c and 2.50c out of store. Sheets are quoted at 2.50c for No. 12 and 2.35c for No. 10.

OLD MATERIAL.—The market for scrap is rather quiet considering the condition of the pig iron trade. Prices are, however, a little firmer, showing the result of the scarcity of pig iron and the increased use of scrap in rolling mills. Following are prices at Cincinnati:

Old No 1. Wrought Railroad, net tons	$ 20 50 to 21 00
Cast Machine and Foundry, net tons	14 50 to 15 00
Old Iron Rails, gross tons	25 00
Old Steel Rails, gross tons	24 00
Old Short Lengths, gross tons	17 50 to 18 00
Old Iron Axles, gross tons	36 75 to 37 00
Old Iron Car Wheels, gross tons	19 50 to 20 00
Stove Plates, gross tons	11 00 to 11 25
Wrought Turnings, net tons	14 50 to 15 00
Cast Borings, net tons	9 50 to 9 75

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1909, NO. 150 NASSAU ST., July 1.

PIG IRON.—The situation in pig iron is becoming more acute with the lapse of each week. During the past week unusual activity appears on the part of foundrymen who have not made full provision for this year's requirements. Of prices for immediate delivery no two quoted are the same. In some cases the premiums have reached as high as $3 a ton. Southern producers are manifesting a willingness to come to the aid of their customers who want material for delivery in the fall. One large producer figures on having some 10,000 tons available for this purpose, and is selling to regular customers at the rate of $20 for No. 1 foundry at furnace, $19 for No. 2 foundry and $18.50 for No. 3 foundry. Another large Southern company answers all inquiries as to fall deliveries by saying that it cannot now say how much iron, if any, it will have. Foreign irons still continue to be sought, but are obtained with greater difficulty than for weeks past, prices being now about $1 a ton above those of a month ago. Purchasers of Pennsylvania irons for delivery this year are becoming apprehensive about shipments, in view of the strike. Their efforts to get Southern iron to help out are not very successful.

The situation regarding 1903 sales underwent no change in the week. Inquiries were quite brisk, but so far they have been productive of no sales of consequence. Although advices of considerable sales at Birmingham for next year are promulgated, it is believed here that the total thus far is not large. Several agents here of Southern producers say that their concerns persist in the determination not to do business for 1903 for at least two months.

Reports are received of prospective disturbances in the Birmingham district over the adjustment of the coal miners' scale. The local officers of several producers state that they have nothing definite to offer in the matter. Some do not place much reliance on reports of probable trouble, while others admitted that the men seemed bent on making demands that might lead to it. Prices for New York delivery for the summer are about as follows: No. 1 X, $23.50 to $25; No. 2 X, $22.50 to $23.50; No. 2 plain, $22 to $23; No. 1 foundry, Southern, $21.75 to $22.75; No. 2 foundry, Southern, $21.25 to $22; No. 3 foundry, Southern, $20.75 to $21.50; No. 4 foundry, Southern, $20.25 to $21.

FINISHED IRON AND STEEL.—During the week advices were to the effect that the scarcity of structural material was more marked than in the week previous. The supply of material from abroad has met some urgent demands. German producers show a marked willingness to help consumers here, but at firmer prices. In sheared steel plates, the market is especially brisk. Several large mills announce that they have taken their full quota of orders for the present year. This has been due largely to the great demand from ship and bridge sources. In sheets the market is without feature. In black sheets deliveries are slow, but in galvanized they are quite satisfactory. There is some gossip relative to sheet production having become restricted for various reasons, but jobbers here attach little importance to the reports. New York prices are as follows: Beams and channels, 15 inches and under, 1.75c to 1.95c; angles, 3 to 6 inches, 1.75c to 1.95c; zees, 1.75c to 1.95c; bulb angles, 2.05c to 2.25c; deck beams, 2.05c to 2.25c; sheared steel plates, tank, 2.10c to 2.15c; flange, 2.25c to 2.30c; firebox, 2.30c to 3.50c; sheet steel, No. 28, black, in carloads, New York, 3.18c to 3.25c; galvanized, No. 28, 70 and 10 off.

PHILADELPHIA.

July 1.

A number of the furnaces in Eastern Pennsylvania are still banked on account of the anthracite coal strike and great inconvenience is caused to the foundries and rolling mills. The situation shows no signs of relief for the stringency which has prevailed for a long time. The problem how to obtain a regular supply of material is serious. Iron that can be picked up either in this country or in foreign markets is eagerly taken. Receipts from other countries are assuming considerable proportions. The demand is enormous and there are no indications of any decrease from current requirements. While sheets, wire nails, barbed wire and to some extent bars are easier than they were two or three weeks ago, the lines involving the heaviest tonnage appear to be carrying more orders than ever. The rail mills, bridge works, car shops and locomotive works were never more crowded.

PIG IRON.—Prices for spot iron as well as for forward deliveries, are moving upward and it is hard to see how further advances can be prevented unless the scarcity of fuel causes a great decrease of consumption. Everything is sold close up and it is only small chance lots that can be purchased. It is difficult to quote prices with accuracy, but they are about as follows for city and nearby deliveries during the last quarter of the year, July, August and September deliveries being $1 to $2 higher: No. 1 X foundry, $23 to $23.50; No. 2 X foundry, $22 to $22.50; No. 2 plain, $21.50 to $22; standard gray forge, $19.25 to $19.75; ordinary gray forge, $18.75 to $19; basic, $21 to $21.75; low phosphorus, $22.75 to $23; No. 3, Middleboro, $21.50 to $22; Scotch Irons, $22.50 to $23.50, the

latter three for prompt shipments. For deliveries during the first half of 1903 prices are substantially the same.

FINISHED MATERIAL.—There is plenty of demand and deliveries prior to August or September can not be readily obtained. The capacity of the finishing mills has, however, grown more rapidly than the furnace capacity and with the exception of structural material, it is easier to get deliveries of rolled material than it is to get pig iron. Bars are a trifle weaker. We quote as follows: Plates in small lots, 2.10c to 2.15c; ¼-inch and thicker, carload lots and upward, 2c to 2.05c; universals, 2c to 2.05c; firebox, 2.25c to 2.30c; marine, 2.30c to 2.35c. Refined iron bars are quoted 1.95c to 2c; steel bars, 1.85c to 1.90c; beams, angles and channels, 2.25c to 2.50c.

OLD MATERIAL.—There is a fairly good demand, but there is no distinct change in prices. We note a sale of 1,000 tons of heavy steel scrap at $21. Stove plate is quoted at $14; machinery cast scrap, $19; choice railroad scrap, $23.50 to $24; No. 1 yard scrap, $19 to $20; old car wheels, $20 to $21; iron axles, $29 to $30; steel rails, $20.50 to $21.50.

The Strike Situation in Worcester.

(Special Correspondence.)

WORCESTER, July 1.—The situation in the machinists' strike is very quiet and the manufacturers have considered that there is nothing to concede in the demands made upon them, so have done nothing but sit still and await developments. Yesterday, however, the pickets were so active at the Prenelce Bros. plant that the company was forced to obtain an injunction, prohibiting any interference with the conduct of their business or interfering with men already at work. A local paper states this morning that the machinists' union has engaged counsel to fight the injunction.

United States Steel Corporation Earnings.

A statement of the net earnings of the United States Steel Corporation for the quarter ending June 30 has just been issued. Earnings for April last were $12,320,766, for May $13,120,930, and for June, estimated, $12,250,000, making a total of $37,691,696, against $26,362,000 for the same period last year. This statement shows an increase of net earnings for the quarter of $11,329,696. The regular quarterly dividends were declared of 1¾ percent on the preferred stock and 1 percent on the common. James Gayley, a vice president and director of the corporation, was elected to the vacancy in the executive committee.

Since last year the Shelby Tube Co. has been taken over by the corporation and part of the increased earnings during the quarter were due to this acquisition. The total net earnings for six months, from Jan. 1 to June 30, were $64,407,153. After paying $9,120,000 interest and crediting $6,796,456 to the sinking fund there remained a balance for dividends of $48,490,697. After payment of dividends there was left an undivided profit account for the six months of $20,463,623, applicable to the depreciation and reserve fund, new construction or surplus.

A Mahoning Valley Steel Plant.

The report that interests identified with several of the merchant furnaces of the Mahoning Valley would form a company to build a steel plant at Brier Hill, on the edge of Youngstown, O., has been revived in the past week. The project is not a new one, but there is no tangible evidence that it is to be carried out in the near future. Julian Kennedy has been named in the reports as the engineer for the plant, but it can be said that no definite plans are in existence.

The net earnings of the United States Cast Iron Pipe & Foundry Co. for the fiscal year ending May 31, 1902, were $711,184.02, and the preceding fiscal year $210,533.67, an increase of $500,650.35.

A Philadelphia telegram says that Mason G. Worth and others will incorporate, with a capital of $3,000,000, the Delaware River Steel Co. for the purpose of building a steel plant on the Delaware River, to supply the new Delaware River Ship & Engine Building Co., and that $1,500,000 bonds will be issued, to be underwritten in New York.

AMALGAMATED SCALE ADJUSTMENTS.

July 1, the opening of the new scale year, finds the Amalgamated Association of Iron and Steel Workers with no trouble on its hands owing to the refusal of mills to sign the scale formulated at the Wheeling convention. The scale has been signed by both the American Sheet Steel Co. and the American Tin Plate Co., and the footnotes of the tin plate scale were adjusted at a conference held in New York this week. The Republic Iron & Steel Co. has signed the bar iron scale and it is probable that the American Steel Hoop Co. will do likewise at a conference to be held in Pittsburg this week, when the rearrangement of several footnotes will be discussed. The independent mills in the West have nearly all signed the scale as prsented and a number of mills in the East have signed scales with the association as adjusted to the trade situation there.

On Monday of this week the Amalgamated Association required all of its members to leave so-called "open mills," but in no instance has the enforcement of this rule resulted in trouble. After the strike of last year the association permitted its members to seek employment in non-union mills, believing that their influence would result in the formation of lodges and an increase in membership. Additions have been made to the association membership in the East, a number of new lodges having been organized, but no good was accomplished in the West. The mills that have signed the Amalgamated scale, expiring June 30, 1903, are as follows:

Republic Iron & Steel Co., Chicago, Ill.
American Sheet Steel Co., New York.
American Tin Plate Co., New York.
Lake Erie Iron Co., Cleveland, O.
Westerman & Co., Lockport, N. Y.
Niles Iron & Sheet Co., Niles, O.
Ohio Rolling Mill Co., Findlay, O.
The Zanesville Iron Co., Zanesville, O.
Tennessee Coal, Iron & Railroad Co., Bessemer department, Birmingham, Ala.
American Rolling Mill Corporation, Muskegon, Mich.
Neal Bros., Pittsburg.
Railway Steel Spring Co., Detroit, Mich., plant.
Phillips, Nimick & Co., Pittsburg.
N. & G. Taylor Co., Cumberland, Md.
National Tube Co., Continental Department, Pittsburg.
Lockhart Iron & Steel Co., Pittsburg.
Ewald Iron Co., Louisville, Ky.
Zug & Co., Pittsburg.
Wayne Iron & Steel Co., Pittsburg.
Youngstown Iron, Sheet & Tube Co., Youngstown, O.
Tyler Tube & Pipe Co., Washington, Pa.
Fort Pitt Iron & Steel Co., Pittsburg.
Carnahan Tin Plate & Sheet Co., Canton, O.
Continental Iron Co., Wheatland, Pa.

Wage Advances at Steel Corporation Plants.

While officers of subsidiary companies of the United States Steel Corporation have not made any formal announcement, it is understood that the day laborers at a number of the plants of the company were given a voluntary advance in wages amounting to 10 percent on July 1. Such an advance has been made to the employes of the Carnegie Steel Co., the Lorain Steel Co. and the Illinois Steel Co. Announcements are expected to be made at some other plants, but the action in each case is taken by the manufacturing company.

A report of the May operations of the Alabama Consolidated Coal & Iron Co. shows net earnings, after allowing for interest, royalties and depreciation, of $50,167.76. The surplus for the month is about $35,000 after a deduction for the preferred dividend of a month. The company is sold ahead for five or six months and whatever sales are made for next year are on the basis of present prices. Additional coal mines and coke ovens are gradually being brought into operation and the output of the first six months of the fiscal year, to April 30, as compared with the average output for six months of last year shows approximate increases as follows: Coal, 50 percent; coke, 60 percent; pig iron, 10 percent.

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JULY 3, 1902.

THE AMERICAN FOUNDRYMEN'S ASSOCIATION.

The report we have already given of the Boston meeting of the American Foundrymen's Association gives it title to first place among the association's conventions. Elaborate entertainment often goes farther in estimating the success of such a gathering than features which measure an association's achievements in the line of its work; but judged from either standpoint the Boston meeting ranks high. There was an abundance of material in the papers to appeal to the foundryman who personally deals with the problems of the molding floor and the cupola, and there were not lacking contributions classed by many everyday foundry workers as rather more "scientific" than their practice demands. But the discussions showed that what a few years ago would have been regarded as over the heads of the average foundry manager or foreman is now being intelligently employed, and that science applied with discrimination is giving many foundrymen larger leeway and better economy in the purchase of raw materials and lessening the contributions of the molding floor to the scrap pile.

Two new developments at the Boston meeting may have an important influence on the future of the association. One was the movement of the foundry chemists and metallurgists for the formation of a section devoted to their work, with a view to taking out of the general proceedings the more technical matters pertaining to their specialty. This action may open the way to agreement on standard methods for foundry analysis irrespective of blast furnace laboratories. Yet it need not preclude co-operation of outside chemists in this work. The second important action was the response to the request of the Associated Foundry Foremen to get into close relation with the association. It would seem, with the growth of the employers' associations devoted to questions of wages, apprenticeship, shop regulations and output, the foremen, who are most immediately interested in shop practice and improvement, may become an increasingly influential element in the American Foundrymen's Association.

We have commented from time to time on details of the association's work. It is gratifying to note that the Boston convention has given it a new lease of life and that its work, thanks to the splendid efforts of a few men whose zeal has never flagged, promises to be of more practical value to the foundry trade than ever.

BRITISH INDUSTRY AND THE AMERICAN PERIL.

Industrial conditions in Great Britain have brought some curious developments that indicate much more than a change in the attitutde of thinking men toward the old order of things. We have called attention before to the growth of sentiment in favor of reciprocal trade, rather than the one-sided free trade of Cobden and Bright, which seems to have lost much of its old prestige. The recent debate on the coal duty in the House of Commons brought out a suggestion which indicates this trend of thought and as it has reference to the iron and steel industry it is worth mentioning.

A member on the Ministerial side of the House pointed out that it would be a desirable thing to tax the waste of coal which is used in the production of steel. An enormous tonnage of coal is used in the steel industry and it was argued that if waste were taxed there would be the double advantage of conserving the coal supply and at the same time inducing the manufacturers of steel to adopt more improved appliances.

The suggestion received no welcome from the chancellor of the exchequer and served no more useful purpose than to emphasize the fear entertained by many in view of the rapid exhaustion of British fuel resources. Something more than legislative enactment is necessary to force the adoption of highly improved manufacturing devices and the member of Parliament who has the belief that fuel economies will go very far toward solving the problem of international trade progress for Great Britain is apt to be rudely undeceived. Perhaps the vigorous house-cleaning which has been carried on during the past few years of searching self-examination has failed of popular notice, and politicians may be unaware of the effort of the British manufacturers of steel and of machinery, not only to set their houses in order but by the free discussion of the advanced practice of their competitors to improve greatly both men and methods.

The report of the commissioners sent to the United States last year by the British Iron Trade Association has just been made public at the association's annual meeting. It deals with the wonderful advance in the American iron industry and points the way to such a rehabilitation of the iron and steel works of Great Britain as shall make them better able to stand in the day of sharper competition that is believed to be ahead. While President Parkes, of the British Iron Trade Association, who was one of the delegates to the United States last year, feared that in time of slack demand in the iron market of the United States our manufacturers would bring disastrous competition to the British iron trade, this view was dissented from at the meeting. A more optimistic member of the association found in the

present conditions in the United States great encouragement to English iron masters to go ahead with the rebuilding of their works so as to rival the most perfect found in the United States. He believed the remedy for the ills of the British iron industry lay with British manufacturers themselves. This view is endorsed by Mr. J. S. Jeans, editor of the London *Iron and Coal Trades Review*, who was a member of the commission to the United States. He says:

As the standard of the British iron industry gets raised, as it is now being, and must increasingly be in the near future, our captains of industry will probably marvel that they were satisfied to go in the old rule-of-thumb fashion so long as they have done, and probably also many things in English iron making practice that are now accepted as matters of course will, ere long, be regarded as conditions that should have been effete and discarded generations ago. In the iron trade, more than in most great branches of commerce and industry, "the race is to the swift and the battle to the strong," and this is an essential complement to the Darwinian law of industry in the time to come.

The question is: Can the British iron industry be sufficiently Americanized to make it proof against American enterprise and natural advantages? We shall not have long to wait to see.

THE CONSUMPTION OF TIN PLATE.

Chas. E. Lawyer, secretary-treasurer of the Tin Workers' International Protective Association of America, is an unusually intelligent and fair-minded labor leader. In his official letter last week, however, he makes some assumptions and draws some conclusions which are not strictly correct. He discusses the tin plate industry, and as an introduction to a general suggestion that organized workmen could do much towards promoting the consumption of tin plate, he says:

That tin plate is not used so extensively as when it was sold at a less price per box can be fully verified by an investigation. This is one of the penalties of the increase in price of any product; increase in price creates a demand for a substitute; inventive genius is stimulated and in the course of time the substitute is produced, which not infrequently proves to be the equal if not the superior of the original article. In the latter event the demand for the original is entirely superseded by that for the substitute. It is hardly necessary to point out to those familiar with it that this has occurred in the tin plate industry, originally as the result of the increase in price and during the last two summers as a result of the manufacturers' inability to carry out their contracts with the consumers.

There is no question that Mr. Lawyer is correct in his statement that the consumption of tin plate has been interfered with by the protracted periods of idleness of the tin plate mills in the past two summers, the idleness in neither case being, by the way, caused by Mr. Lawyer's organization, but by the foolish counsels of Amalgamated Association leaders. But that "tin plate is not used so extensively as when it was sold at a less price per box" is not true. Below are presented the statistics for the past 31 years. Up to 1891 the imports were equivalent to the consumption; since then the imports, plus the domestic production, equaled the consumption. What is shown as consumption in the following table includes the imported tin plate which was made into cans and other containers and re-exported, but this is really consumption in the United States, as the processes of can manufacture were carried on here.

TIN PLATE IMPORTS (EQUIVALENT TO CONSUMPTION) INTO UNITED STATE CALENDAR YEARS, GROSS TONS.

Year.	Imports.	Year.	Imports.	Year.	Imports.	Year.	Imports.
1871	82,969	1876	89 946	1881	183.005	1886	257 822
1872	85,629	1877	112,479	1882	213 987	1887	283,836
1873	97 177	1878	107,864	1883	221.233	1888	298,2 8
1874	79.778	1879	154,250	1884	216.181	1889	331,311
1875	91 054	1880	158,049	1885	228,596	1890	329 435

TIN PLATE IMPORTS, PRODUCTION AND CONSUMPTION, CALENDAR YEARS, GROSS TONS:

Year.	Imports.	Production.	Consumption.	Year.	Imports.	Production.	Consumption.
1891	127,882	999	328,881	1897	83,851	256,598	340,449
1892	2 8,472	18,803	287,275	1898	67,222	326,915	394,137
1893	253. 55	5 ,182	208,337	899	58,915	360,875	419,790
1894	215 068	74,260	289,328	1900	60,386	302,665	363,051
1895	219.545	113,669	333 211	901	77.395	399 291	477,686
1896	119,171	160,362	279,533	.....	.....	.....	.....

From the above tables it appears that the consumption of tin plate has steadily increased, barring a few small retrograde movements, the most important of which was the retrogression in the years of financial depression from 1893 to 1896 inclusive. It is not the case, as would appear from the table, that the decreased consumption started in the calendar year 1892. Imports were extremely heavy for months before July 1, 1891, when the increased tariff duty went into effect, and the stocks accumulated then furnished much of the tin plate consumed in 1892. A slight decline in consumption occurred in 1900.

Consumption increased very rapidly in the period from 1871 to 1888, and admittedly at a more rapid rate than it has in subsequent years, but there was a special cause for this. In the earlier years the tin plate was made wholly from iron, and the period in which consumption increased so rapidly saw the substitution of steel for iron, bringing down the cost from $12 to $13 a box in the early seventies to $6.75 in 1880 and $4.55 in 1888.

This increased consumption was in line with Mr. Lawyer's theory that consumption depends upon cheapness. But the rule did not work out so fully later. In the three years 1890 to 1892 inclusive, the average price of 100-pound coke plates was about $5.00 at New York, and the consumption averaged about 320,000 tons a year. In the summer of 1898 the very lowest prices on record at any time were made, a few orders being taken at $2.60 at mill, while the average price for the year was about $2.85 at New York. Here was a decline from $5.00 to $2.85, and an increase in consumption only from 300,000 to 394,000 tons, and this in a period of some eight years. On the other hand, in the period of only three years from 1898 to 1901 the consumption increased from 394,000 tons to 478,000 tons and this was done in the face of an increase in the average price at mill in the respective years from $2.65 to $4.00 a box. Mr. Lawyer's law of consumption depending on cheapness, which worked fairly well from 1871 to 1898, has been hopelessly lost in the last three years—the very years which he had particularly in mind in stating his law.

The explanation of the movement, however, is simple enough. Tin plate is extremely cheap whether it sells at $3 a box or $5 a box. At present

prices at mill a cent's worth of tin plate makes a two-pound fruit can. The country has become wonderfully prosperous since 1898 and can well afford to pay the higher price which, by the way, does not show nearly as great an advance as do pig iron, billets and many other iron and steel lines.

After all, Mr. Lawyer's reasoning is not so very defective. Tin plates have not increased greatly in price, and in proportion to the purchasing power of the country they are much lower than a few years ago. Therefore it should not be expected, according to the rule, that the consumption should fall off, and the fact is that it has shown a very satisfactory increase. Mr. Lawyer makes an interesting suggestion. He points out that the use of tin plate can be increased by the workmen themselves. The decreased supply of cedar opens the way for a substitution of tin plate for boxes for packing cigars. In discussing the possibilities of helping along the substitution of tin plate for wood in this line, he says:

The best plan for securing this result, if such is possible, is a matter for careful consideration. Suppose that each and every tin plate worker when buying a cigar should make a special demand for cigars packed in tin boxes and continue making this demand until he got it; suppose he should use his best efforts and succeed in getting his brother trade unionist to do likewise; suppose his national organization should appeal to members and friends of organized labor everywhere to adopt the same policy, is it not fair to presume that this would do much toward bringing about the desired results?

IRON AND STEEL IMPORTS AND EXPORTS.

The import movement of iron and steel gained considerable headway in May, and the increase, both of pig iron and steel, in that month as compared with the preceding months of the year was marked. For these two products the following table tells the story of the inward movement since Jan. 1. The column for steel includes ingots, blooms, slabs, billets and bars of steel and steel "not elsewhere specified," structural steel being thus included:

IMPORTS OF PIG IRON AND STEEL—GROSS TONS.

1902.	Pig Iron.	Steel.
January	7,883	5,313
February	8,307	2,235
March	17,184	6,570
April	19,067	11,986
May	30,708	24,388
Five months	83,149	50,492

It will be seen that pig iron is now coming in at the rate of about 1,000 tons a day and steel at close to the same rate. The table below gives in detail the imports for May, which, it will be seen, amount to nearly six times the tonnage for May, 1901, in the articles reperesented:

IMPORTS OF IRON AND STEEL TO THE UNITED STATES.—GROSS TONS.

	May.		11 mos. end'g May.	
	1901.	1902.	1901.	1902.
Pig iron	4,817	30,708	33,212	136,503
Scrap	581	11,768	18,450	36,428
Bar iron	904	1,195	15,714	21,306
Iron	8	5,151	581	9,086
Hoops, band or scroll	62	5	2,201	3,692
Steel ingots, slabs, billets or bars	711	24,388	8,115	54,819
Sheets and plates	136	196	1,663	7,222
Tin and terne plates	4,953	6,380	48,975	53,020
Wire rods	1,943	2,174	16,634	10,356
Wire and wire articles	174	274	2,532	3,930
Total	14,289	82,239	146,477	356,382

The total value of iron and steel imports for May, not including ore, was $3,253,361, against $1,557,638, or less than one-half as much, for May, 1901. For 11 months the total was $23,544,325, as against $16,408,996 for the 11 months ending May 31, 1901. Iron ore imports in May were 153,558 tons, against 100,857 tons in May, 1901, and for the 11 months 1,097,776 tons, against 678,533 tons.

The value of exports has been decreasing from month to month, as is well known, and the export tonnage has fallen off to an even more marked extent. For May the value of iron and steel and machinery exports was $8,392,108, as compared with $10,255,599 last year; for the 11 months the value was $90,780,571, as compared with $109,483,827. The great decline in export tonnage appears in the following table:

EXPORTS OF IRON AND STEEL FROM THE UNITED STATES.

GROSS TONS.

	May.		11 Mos. end'g May.	
	1901.	1902.	1901.	1902.
Pig Iron { Ferro	.....	.....	16	.....
Pig Iron { All other	1,569	1,673	252,621	52,613
Scrap	1,406	784	31,781	12,697
Bar Iron	1,951	3,334	22,6 6	14,494
Wire Rods	1,078	2,741	9,1 7	10,766
Steel Bars	1,599	649	78,577	15,010
Iron Rails	13	.....	1,760	632
Steel Rails	42,530	8,031	341,683	159,309
Billets, Ingots and Blooms	686	303	120,930	2,701
Hoop, Band and Scroll Iron	207	152	3,617	1,564
Iron Sheets and Plates	840	259	7 692	3,983
Steel Sheets and Plates	2,523	2,264	46,815	10,874
Tin Plates, Terne Plates and Taggers' Tin	16	133	599	719
Structural Material	7,077	3,530	60,211	50,406
Wire	7,304	11,010	66,070	90,704
Cut Nails	1,311	1,190	10,820	6,389
Wire Nails	1,926	2,805	19,128	17,985
Other Nails, incl'd'g Tacks	107	128	1,719	1,727
Total	72,144	38,986	1,072,798	461,673

Obituary.

Adam Laytham, proprietor of the Eagle Brass & Iron Foundry, Passaic, N. J., died at his home at the latter place on Saturday, June 21, at the age of 61 years. Deceased was prominent in the foundry business in the East having assisted in the organization of the Passaic Iron Foundry and at the time of his death was interested in the E. C. Hay Foundry and the Newark Iron Foundry, at Newark, N. J.

A recent meeting of the Brown & Sharpe Quarter Century Club was held at Providence, R. I. To be a member of this organization the applicant must have been in the employ of the firm for the term of 25 years. The club was organized in 1896 with a membership of 23 and now numbers 39. Four members have died since the date of organization. The officers are: Richmond Vial, president; William E. Ripley, secretary, and John T. Cranshaw, treasurer. The existence of the Quarter Century Club is not only a potent reminder of the healthy conditions existing in and around the plant of the Brown & Sharpe Mfg. Co., at Providence, but proves that in machinery making as in other pursuits there may be found that virile persistency that "never resigns and seldom dies." It would be interesting to learn how many Quarter Century Clubs are to be found in other plants and countries. Those who have the pleasure of an acquaintance with these gentlemen of the Quarter Century Club will freely agree that in this instance age does not mean antiquity and will wish for the members many more years of employment in prosperous health with the ever youthful plant on the clam laden shores of Narragansett Bay.

The Standard Roller Bearing Co., of Philadelphia, has recently purchased the complete plant and equipment of the Roller Bearing & Equipment Co., of Keene, N. H., and as soon as practicable will move the machinery and business to the company's new Philadelphia factory now in course of erection. This purchase, together with that of the Grant Roller Bearing Axle & Wheel Co., of Cleveland, recently noted, will give the Standard Roller Bearing Co. a large control over the roller bearing field of the United States.

The Sharon Steel Co., Sharon, Pa., is erecting a two-story addition to its office building, 51x72 feet.

The Machinery and Metal Working Trades—News Letters from Selling Centers.

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1909, No. 150 NASSAU ST., June 30.

The month of June in the machinery market in and around Greater New York afforded new proof that with the advent of the summer months a falling off in trade can be counted upon. Representatives of machinery houses are a unit in the statement, that their business during June showed a tendency to slacken. Yet the decline in the volume of trade was not of great proportions by any means. It was simply of a character that made it less difficult to attend to orders than in previous months. One manufacturer analyzed the month's developments very aptly when he said that while his business was good, it didn't require the services of so many salesmen and clerks to handle it, as the business he did in May for example.

The results of the month met with general satisfaction. Houses which have been rushed for some time were enabled to make considerable progress with orders that have received little or no attention. Sales agents played a prominent part in this connection, and utilized the mails pretty freely in urging quicker shipment of machinery than promises already given them indicated. Yet if any credence is given some reports, it would seem that deliveries are worse now than they have ever been. The delay in the shipment of heavy tools is particularly noticeable, and from all accounts is likely to continue for some time. While no one doubts that the scarcity of raw material has been a potent factor in belated deliveries, other contributing causes have been the scarcity of so called labor on one hand, and difficulties with employes on the other..

On all sides are heard comments on the great amount of business that could be done if orders could be executed within a reasonable time. But it is an ill wind that blows nobody good, and second hand machinery dealers tell with no little satisfaction of the increased trade they have been doing, which they attribute in no small measure, to the delay attending the delivery of new machinery.

From inquiries received during the month, it would seem that manufacturers are making preparations on a large scale for overhauling machinery at present installed in their plants, and in many cases replacing it with machinery that represents the best in recent construction. Not a few houses are counting on orders because of this.

The month's export trade was without a single feature worthy of mention. Practically little or no attention is given to foreign orders. Those received owed their origin, for the most part, to inquiry emanating from abroad, and not to hustling. The general opinion is that the export trade will not amount to anything as long as domestic orders abound in such good proportions. When domestic trade becomes dull, new life will doubtless be injected into the work of obtaining foreign orders.

Views concerning the outlook for trade continue most optimistic. The present industrial prosperity of the country, embracing as it does nearly all manufacturing lines, is considered to insure good business for a long time to come. Allusion is made to the immense amount of money awaiting investment in almost anything that offers a fair return. Manufacturers of machinery, who keep a sharp eye on possibilities of trade, find much to encourage them in the many industrial establishments that have been incorporated during the present year. While some of these never get beyond the certificate of incorporation, they believe that in a majority of cases they lead to the construction of plants, which in turn necessitate the purchase of machinery. They also lay stress on the fact that while not long ago the name of a capitalist on the directory of an industrial corporation was a rarity, now it has become almost the rule. The interpretation given to this is that capitalists are becoming alive to the possibilities of our industrial domain, and are utilizing their wealth accordingly. As long as this state of affairs continues, they believe that machinery will continue to be purchased in large quantities.

At the opening of the month hopes were entertained that the Government would be a large purchaser of machinery, in consequence of its fiscal year ending July 1 and the fact that all unexpended appropriations reverted to the treasury at that time. These did not turn out to be as large as anticipated, and the purchases made, while considerable, fell below expectations.

The Advance in Lathes.

One of the most notable events of the month was the meeting of lathe manufacturers which was held at the Waldorf-Astoria for the purpose of considering an advance in prices. The movement had its inception in Cincinnati and the proceedings were presided over by William Lodge of that city. Twenty-eight lathe builders were in attendance, none of whom, however, make larger than 30-inch lathes. Notable absentees were the Niles-Bement-Pond Co., and Manning, Maxwell & Moore. There was not entire agreement among the attendants at the meeting even though an advance of 10 percent was agreed upon and is now in force. Opinion was unanimous, however, that the high price of raw material, together with the corresponding increase in the price of castings, justified the action taken. Some manufacturers contended that prices should have been advanced long ago, if at all, conditions now being no different from what they were several months ago. Others argued that the advent of the summer season, with the dullness that generally accompanies it, was inopportune for the adoption of such a policy, especial stress being laid upon the belief that it might have a tendency to decrease the volume of trade. Those who approved of the advance declare that there was no other course open to the manufacturers, in view of the increased cost of production. The answer is that no matter what kind of an agreement the manufacturers entered into, it cannot be made iron-clad enough to have it prevail. An adverse view, and one which embodies nearly all of the discordant notes heard in connection with the matter, is the following from a well known manufacturer:

"If those responsible for this advance think for a moment that it will hold, I am afraid they are doomed to disappointment. In the first place only those manufacturing 30-inch lathes were represented at the meeting. These have already informed us that we must pay them 10 percent more for their lathes than we did several weeks ago, and say that the cost of production forced them to raise prices. Nobody questions this; but here we are confronted with this situation: There has been no advance, at least of a concerted character, in lathes over 30-inch. These can be bought now for the same prices that were asked several weeks ago. Now the cost of production in these lathes has increased in the same proportion as that in 30-inch lathes and under, and you can see, therefore, how difficult it is to apply the cost of production argument, when it is a question of establishing uniformity of price. To make the latter of any consequence, it must affect large as well as small sized tools, especially where conditions are the same in the manufacture of both."

"Then, another reason why I don't think much of this agreement, is the ease with which it can be and will be, broken. Here's a manufacturer who hears where a lathe is wanted. He sets a price on it. The proposed purchaser sees that this represents an advance of 10 percent over what he would have paid for the same lathe several weeks ago. A snag in the negotiations is encountered. The seller may be one of those who subscribed to this 10 percent advance, but when he observes that insistence upon it is likely to prevent a sale, the chances are ten to one that he will ask with the politician, 'What's the constitution between friends?' and sell his lathe at the price he got for it before he attended that meeting at the Waldorf-Astoria.

installation in the plant of the General Electric Co., at

"Another thing that will operate against maintaining this advance, is the individuality which enters into the construction of lathes. Every lathe on the market has some feature which makes it superior to others of its kind, in the estimation of somebody, and I think you will find that this has more to do with the price than anything that can be mentioned. Take two lathes adapted for the same kind of work, made by different manufacturers, parties to this 10 percent advance. The superiority of one lathe will govern the price of the other, and agreements as to prices will have nothing to do with it. The man with the supposedly inferior lathe has but one recourse if he hopes to make a sale and that is to drop under the agreed basis."

Another manufacturer expressed the opinion that the advance would perhaps be open to no objection, if the present industrial prosperity gave signs of long vitality. While inclined to be optimistic on this point, he said it would be well to count upon a cessation of present activity some time, and was inclined to the belief that something in this direction could be expected early next year. In the meantime, he thought, an advance in prices was not desirable.

Higher Prices for Radial Drills.

Makers of radial drills are raising their prices. In some cases as much as 10 percent advance has been secured. In connection with the argument that the increased cost of raw material justifies higher prices for the finished product, it is interesting to observe that everywhere the opinion prevails that the United States Steel Corporation has been the controlling factor in keeping the increase within reasonable bounds. It is generally conceded, that with conditions as they have been for some time, it would have been very easy for the United States Steel Corporation to have run up prices far beyond the present level. Its conservative policy is highly commended by tool manufacturers.

The New York Blower Co., No. 39 Cortlandt St., manufacturer of blowers, exhausters, heaters, and engines, reports an unusually brisk business for June. D. T. Lyon, the New York manager, states that the company was forced to refuse some $50,000 worth of orders recently, in consequence of inability to fill them within reasonable time. To meet the increased demand for its products the company will make substantial additions to its plant at Bucyrus, O.

At the offices of the Lidgerwood Manufacturing Co., No. 96 Liberty St., it was stated that the business the company is now doing is better than at any time in its history. This is particularly true of hoisting machinery, for which many substantial orders have been received recently. At the plant in Brooklyn the men are working in shifts that make up 22 hours a day, in order to fill existing orders. For sometime rumors have been in circulation that the company intended moving its plant, which is one of the largest industrial establishments in Brooklyn. An officer of the company says that nothing definite had been decided concerning the matter. The plant has proved inadequate in spite of recent additions, to meet the demands upon it. Increased facilities will have to be sought in the near future, but whether a new site will be chosen is still undecided.

The Chapin-Love Machine Co., No. 125 Worth St., reports that while business fell off recently, it is fully occupied filling orders on the books. During the present year the company has sold a large number of the sensitive drills of which it makes a specialty, and has received many flattering testimonials from customers.

The Crocker-Wheeler Co., engaged in electrical manufacture and engineering, No. 39 Cortlandt St., is doing an excellent business in motor-driven tools. So many injuries have been received concerning them during the present year, that the company found it necessary to prepare an illustrated catalogue. This is now in press, and will be distributed to the trade shortly. Some of the establishments which recently gave the company orders for generators are: The Hendy Machine Co., Torrington, Conn.; Frick Engine Co., Waynesboro, Pa.; W. S. Tyler Co., Cleveland; Christensen Engineering Co., Milwaukee, Wis.; Bethlehem Iron Works, South Bethlehem, Pa.; American Bridge Co., Pencoyd, Pa.; Allis-Chalmers Co., Milwaukee, Wis.; Pennsylvania Steel Casting Co., Chester, Pa.; Standard Steel Works, Burnham, Pa.; Crucible Steel Co., of America, Pittsburg; Latrobe Steel Co., Latrobe, Pa.; United States Projectile Co., Brooklyn, N. Y.; Marine Boiler Works, Toledo, O.; National Tube Co., McKeesport, Pa.; Banner Iron Works, St. Louis; Joseph Dixon Crucible Co., Jersey City, N. J.; and the Descubridora Mining and Smelting Co., Mexico.

M. H. Treadwell & Co., of No. 95-97 Liberty St., engineers, founders and machinists, did an extremely heavy business during June. One of the large orders was for the rough and machine casting to be used in connection with the construction of the twelve 50-ton open-hearth furnaces which the Union Steel Co. will build at Donora, Pa. It is estimated that at least 1,000 tons of castings will be necessary to fill this order. Another order received was from the American Steel and Hoop Co. for three large scale cars, for use at the Isabella Furnace, Etna, Pa. Recent installations by the firm include a large ice hoist for the Essex Ice Co., at Orange, N. J., and a 15-ton electric traveling crane at the Stoever Foundry & Manufacturing Co., Myerstown, Pa. The firm is also bidding on several large contracts. Recently it opened a branch office at Pittsburg, with L. L. Knox, formerly superintendent of the Riter-Conley Manufacturing Co. of that city, in charge.

At the offices of the Allis-Chalmers Co. at the Broad Exchange Building, No. 25 Broad St., business is reported to be very good. Now that peace has been established in South Africa, the company is going to push its business in that country, but does not expect to make much headway there until the railroads can do something else besides transporting troops or supplies to them.

A. S. Granger & Co., of No. 95 Liberty St., recently took orders for a marine type boiler to furnish steam for a Skinner engine at the Robins Conveying Co.'s plant, Passaic, N. J., and a Whitehill-Corliss engine for the Empire China Works, Brooklyn, N. Y.

The Lawrence Machine Co., No. 39 Cortlandt St., was the successful bidder for the centrifugal pump at the Norfolk Navy Yard, with a capacity of 7,000 gallons per minute.

J. J. McCabe, of No. 14 Dey St., has received several orders for his double spindle lathes for installation in cotton mills in various localities throughout the South.

The New York office of the Chicago Pneumatic Tool Co., No. 95 Liberty St., has been in correspondence with the Japanese government with a view to introducing its tools in Japanese navy and shipyards, and recently received an order from that government for 57 tools. It expects substantial orders from the same source in the near future. During June the company shipped 18 air compressors to different localities in Europe. Domestic trade continues good, one order having been received recently for 200 tools from the Fore River Ship & Engine Works, Boston, Mass.

A Steam Pump Agreement.

For some time past rumors have been circulating to the effect that an organization of steam pump manufacturers would be effected, the primary object being a plan by which production could be more efficiently and economically brought about. It is now said that something tangible in this direction can be looked for in the near future, the moving spirits in the matter being manufacturers not allied with the International Steam Pump Co.. The latter, it is said, controls 75 per cent of the output.

Sales agents of several large chuck manufacturers in this city were notified during the past week of an advance of 10 percent in prices, and to accept no orders except on that basis.

Peter A. Frasse & Co., of No. 94 Fulton St., who have been extremely busy in machinists' supplies, note a falling off in their business in this particular line during the past month. A member of the firm recently returned from a trip through Eastern Pennsylvania, and says that gratifying reports both as regards present and prospective business were given him on all sides.

The Rand Drill Co., No. 128 Broadway, has done an increased business in South Africa since the war closed. The beginning of the struggle found them with a large amount of stock on hand in their various distributing centers throughout that country, in anticipation of several large orders then in process of successful negotiation. Since hostilities ceased, they have made considerable progress in the depletion of it.

The Stirling Co., No. 114 Liberty St., received an order in the week for eight 500-horsepower water tube boilers for

Schnectady, N. Y. The competition in connection with this contract is reported to have been especially keen.

The Eclipse Co., of No. 26 Cortlandt St., was the successful bidder for the two large oil tanks for installation at the works of the American Steel & Wire Co., Worcester, Mass. This company has also received orders for pneumatic tools of various kinds from the Standard Oil Co., East Boston, Mass.; the Bloomsburgh Car Works, Bloomsburgh, Pa.; Oil Well Supply Co., Oswego, N. Y.; Standard Oil Co., Baltimore, Md.; Bethlehem Steel Co., South Bethlehem, Pa.; and the Chicago & Alton Railroad.

George Place, Eastern representative of the J. A. Fay & Egan Co., of Cincinnati, O., at No. 120 Broadway, has made some good-sized sales recently of wood and iron working machinery, nearly all of them, however, in small sized lots.

J. H. Williams & Co., of Brooklyn, N. Y.; are finding it difficult to keep up with the orders they are receiving for drop forgings. Wm. C. Redfield of this firm, who became Commissioner of Public Works for Brooklyn on Jan. 1, is making an enviable name in that position. His mechanical experience is serving him well in the making of needed improvements. He recently established a system of paying employes on public improvements which, it is said, will effect a saving of some $30,000 yearly to the city.

The recently organized American Knit Goods Mfg. Co. will begin work in about two weeks on the construction of a seven-story mill at Wythe Ave. and Rutledge St., Brooklyn, to cost $125,000. The necessary machinery has not yet been purchased.

CLEVELAND.

OFFICE OF *The Iron Trade Review*, 1064 ROSE BUILDING, July 2.

There is a marked upward tendency in prices of machine tools, the usual advance being about 10 percent in the last three weeks. An advance of 10 percent on lathes went into effect July 1. Business is good, but a little decrease in volume may result from the higher prices. In the supply line deliveries are frequently slow.

The Brown Hoisting Machinery Co. is progressing in the rebuilding of its plant destroyed by fire in the fall of 1900, but it will be fully two years from the time of the fire until the new buildings are completed. The handsome new office buildings was thrown open to the hundred officers, clerks and draftsmen last week. It is modern and complete in every particular, one of the features being a large room in which luncheon is served at cost at noon to the men and women employed in the building. There are also reading and smoking rooms.

The Automobile & Cycle Parts Co. is putting out a new standard gear for automobiles which for the first time makes possible mass manufacture of the machines at reasonable cost, as it saves manufacturers the expense of designing and perfecting gears.

The Cleveland Pneumatic Tool Co. has purchased a site 150x150 feet at Hawthorne and Second Aves. and will at once begin the erection of modern factory buildings. The company has outgrown its present shop space and is unable to keep up with orders. About 150 men will be employed in the new plant.

The Garrett-Cromwell Engineering Co. has the contract to build two 25-ton open-hearth furnaces for the Ohio Steel & Iron Specialty Co., manufacturer of stay-bolts, small angles and other steel specialties.

The Automobile & Cycle Parts Co., of Cleveland, announces that after July 1 it will handle the tubing in bicycle and automobile sizes manufactured by the Shelby Steel Tube Co. It will also manufacture and sell under royalty the patent pulleys heretofore manufactured by the Cleveland Pulley Co., of Cleveland.

The plant of the American Foundry & Machine Co., at Ravenna, O., is nearing completion and castings will be made by July 15. The machine shop will be 135x88 and the foundry 125x75 feet. The buildings are constructed with special pains in ventilating and lighting and are very conveniently located for unloading materials and loading the products on cars. The company will make gray and white iron castings, from one pound to 40 tons and manufacture mining, manufacturing and special heavy machinery. Some entirely new designs in machinery for separating metals in ores will be turned out. The foundry has many orders already. The office of the company is in the Williamson Building.

The Winton Motor Carriage Co, Cleveland, in closing contracts for the new machinery to be used in the new plant now being built. Among the orders are eight large screw machines from Bardons & Oliver, Cleveland, three Brown & Sharper universal gear cutters and a number of pieces of wood working machinery from Strong, Carlisle & Hammond, Cleveland; a horizontal boring mill and a large power press from the Lucas Machine Tool Co., Cleveland; two Becker-Brainard vertical milling machines and a Landis grinder from the Marshall & Huschart Machinery Co. and a large turret lathe for turning fly wheels, from the Gisbolt Machine Co. They are in the market for additional milling machines and turret lathes. The company has contracted with Harvey & Sons, Chicago, for an Acme gas plant.

The Warner & Swasey Co. has leased the factory adjoining its plant and will equip it with machinery as an addition to the plant. Later a large permanent addition will be built. The business of the company in machine tools is heavier than ever and the telescope department is also very busy.

The Standard Welding Co. has placed a contract for a new building to increase the capacity of the plant along regular lines. The new building will have a capacity of about 8,000 square feet of floor space and will be used for light manufacturing and storage.

Foot, Burt & Co., Cleveland, will soon have their new factory for manufacturing drills completed. Considerable new equipment was put in.

The building on Superior St., Cleveland, formerly used as a street railroad cable power house, will be converted by the Glauber Brass Mfg. Co. into a modern brass foundry. The company has purchased the building and lot and will expend about $20,000 on improvements. Electric power and lighting will be used throughout the building.

The Ajax Mfg. Co. has purchased the property of the Chicago-Cleveland Car Roofing Co. at the corner of Lake and Dart street for $13,000. This property is adjacent to the plant of the Ajax Mfg. Co. on Wason St. and the company has already occupied it for two months. The recent purchase and the addition of another story to the newly acquired property will more than double the former capacity of the plant. The company has just posted a notice that the working hours of the employes will be reduced from 55 to 53 hours per week. It is understood that this will entail no reduction in wages.

The Acme Machinery Co. is very much in need of the extension to the main plant which is now under way, but it is not anticipated that the building will be under working conditions for two or three months. In the meantime the company is continuing the overtime which has been in vogue for the past two years. The foreign trade of the firm is reported as very satisfactory and that there is a noticeable improvement in the industrial situation in Germany which has been very depressed for sometime. The domestic demand for machinery has rendered the manufacturers here less dependent upon the market abroad and in fact they are doing well to keep that urgent need of the American trade well in hand, but prospects for better conditions across the water act as a guarantee against any slacking of business here.

PHILADELPHIA.

June 30.

During the past month the Philadelphia machinery market has swung along with little or nothing in the horizon to disturb it. The early part of the month was not quite as productive in point of orders as the same period in May, but the end of the month has seen about the same general average. A little lull at this time of year is usual, but barring a fluctuation in the steadiness of orders noticeable through preceding months, no falling off is noticeable. The little unevenness causes no anxiety and is probably attributable to the advances in manufacturing costs and the consequent slight advances asked in many lines for materials. Buyers are naturally a little skeptical as to the maintenance of the advances asked.

It is noticeable that the bulk of the business booked comes from established enterprises, the sales forthcoming from new enterprises being remarkably light. Particularly is this the case in regard to machine tools, and this condition indicates the extent to which machinery builders are crowded. Builders having their own foundries are concerned over the advance in wages secured by the Molders' Union last week, many long contracts being particularly affected by the advance. They claim that with the increased cost there is no increase in the output, therefore an advance in the cost and price of castings must follow. The jobbing foundries, however, say it is a matter which must adjust itself, and so far prices of castings are unchanged. With iron approaching $25 per ton, and not easy to get at that, the matter of getting castings is one occasioning much thought on the part of buyers. Founders have the situation practically in their own hands, and the difficulty in obtaining castings is going to be an important factor in the maintenance of advanced prices for finished machinery.

Dealers' stocks of machine tools are very much depleted, and where direct agents formerly were able to carry a pretty good assortment of consigned stock, there is very little now on hand for the prompt filling of even an ordinary order. Here and there it might be possible to pick up something to suit immediate requirements but the chances are that the opportunity is due to a "turning down" of a prior order, and a purchaser may be considered lucky to get when he wants from stock.

In the case of machine tools for light work, the scarcity is not so apparent. The policy of the larger tool builders' which admits of turning out these tools in large batches has saved the situation, and there seems to be little or no dearth of small tools. Stocks are not what they might be, but pretty nearly all ordinary requirements can be supplied from stock.

Foreign business is dull, decidedly. Inquiries are light, and do not seem to have the spirit in them that characterized the export trade 12 to 18 months ago. Germany it is said is taking a good many orders that in the ordinary course of things should come this way. England is not nearly so good a customer as was the case two years or even one year ago, and inquiries from that country are relatively light.

What is generally a surprise in the market is the acquirement of the plant of the Pottsville Iron & Steel Co. by a syndicate for whom Pilling & Crane, the well known iron merchants of this city, are acting. Rumor connects the acquisition of this plant with the severance of connections by several prominent men connected with the American Bridge Co., and the recent resignation of Percival Roberts from the steel corporation. Anyway, there is already some inquiry in the market for equipment for the plant, and if the reported plans of the new concern are to be carried out there will be orders of considerable magnitude to be placed.

The Tabor Mfg. Co., manufacturer of molding machines, states that June was its banner month in point of orders and shipments, but that the probabilities for the month of July are that all previous months will be excelled. The company shipped in June a complete carload of machines to a single concern in the West, the first complete carload shipment to any one concern; but this was followed by a similar shipment to a New England concern, and yet another to a New York State concern, the case of the latter being only a supplementary shipment and making a total of 95 machines of the Tabor make in use in this particular plant. The company has also made several shipments to England and to Australia. Among the work in hand is a machine for molding sections of a cast iron plate to be used in the construction of a railroad tunnel, the plates to be 26x72 inches. In the making of these molds both halves will be rammed at one time from two patterns. An idea as to the dimensions of the machine is afforded when it is stated that it will work 9 feet in the clear and will weigh 30 tons. It may be safely said that this will be the largest molding machine ever built, and will demonstrate that molding machine building is at about the same stage as machine tool building was years ago, when a 36-inch lathe was thought to be a monster.

The Harrisburg Foundry & Machine Works, whose local office is at 702 Betz Building, report that they are running their plant night and day, and today are extending their machine shops to a new building previously used for pattern storage. The past month was one of the best they ever had in point of business and many good shipments were made. Among those directed by the Philadelphia office are mentioned two 350-h. p. engines for the Merchants' Light, Heat & Power Co., York, Pa.; a 150-h. p. engine for the Steelton Store Co., Steelton, Pa.; a 75-h. p. engine for the Monarch Silk Mills, York, Pa.; a 50-h. p. engine for the Walters Sanatorium, Wernersville, Pa.; three 75-h. p. engines for the Pennsylvania Railroad Building, 15th and Chestnut Sts., Philadelphia; a 115-h. p. engine for the Ketterlinus Printing Co., Philadelphia; a 75-h. p. engine for the Kittatinny Hotel, Delaware Water Gap, Pa.; a 250-h. p. engine for the Colonial Coal & Coke Co., Dorchester, Va.; and two 100-h. p. engines, a 40-h. p. and a 15-h. p. engine for the Commonwealth Trust Co. for its new building at 12th and Chestnut Sts., Philadelphia.

The Director of Public Works of Philadelphia received only two bids for the gas engines and pumps required in connection with the new fire main system mentioned in our last report. The successful bidder was M. R. Muckle, Jr., & Co., of Philadelphia, whose bid was $116,242. The Deane Steam Pump Co., Holyoke, Mass., was the other bidder, at $119,340.

The C. & C. Electric Co., at its local branch reports a continuation of excellent business. It is installing seven ventilating motors ranging from 12 to 30 h. p. in the new addition to the new Ginbel Bros. department store, Philadelphia. The company has also furnished two 100-k. w. direct connected dynamos for the factory of A. M. Collins Mfg. Co., Philadelphia; one each 50 and 25-k. w. direct connected dynamos for the Stanford Apartment House, Philadelphia; and a 75-k. w. direct connected dynamo for the new Breitnall Building, Philadelphia, for manufacturers' connections. It has also made several installations at Atlantic City, among them 50 and 35-k. w. dynamos in the Bartlett office building; and 15 and 50-k. w. direct connected in the Hotel Agnew.

The J. W. Creager Machinery Agency, who occupy large quarters on the machinery floor at the Bourse, report a good average business for the month. They have sold quite a number of Bardons & Oliver and Bradford lathes, and other machines of the different makers they represent. They have also put out several Franklin portable cranes and hoists, which machines they are just introducing in the market.

W. A. Shipley, who also occupies considerable space on the machinery floor at the Bourse and represents the Lodge & Shipley Machine Tool Co., of Cincinnati, and several other concerns, reports that the month of June was fully up to the standard of any other month this year. While no sales of magnitude were made the aggregate of small sales was large.

The Keystone Machine Tool Works are very busy and have work enough in hand for some time to come. Among their June shipments they mention cold saws to Portland, Oregon, and two 36-inch rotary planers to Western points; two cold saws and grinders to St. Louis; and a large slab miller to Cleveland.

The Pedrick & Ayer Co. is exceedingly busy, and much hampered for want of room. The air compressor department is much taxed, and the orders for pneumatic hoists find the department for such goods entirely inadequate. The company has not yet placed its orders for the power equipment of its new plant at Garwood, N. J.

The Wilmington Machine Co., Wilmington, Del., is putting on the market a new hot air pumping engine, and Worth, Bailey & Co., Witherspoon Building, have taken the sole selling agency for home and foreign markets.

The Barr Pumping Engine Co. is working night and day at its plant, and has some very large orders in hand.

The Wilbraham-Green Blower Co. is quite busy on a multitude of orders on its books but is making fairly prompt shipments. The company has just added some much needed equipment to its machine shops.

CINCINNATI.

June 30.

The best evidence that the machinery trade is in a prosperous condition is that machine tool builders have generally decided upon an advance. Makers of lathes and radial drills got together recently and advanced the price of their products ten percent effective July 1. Now the builders of planers and all of the machine tools not affected by the other advance are ar-

ranging for a meeting in New York this week at which it is generally understood they will also advance their tools.

The demand for all kinds of machinery has been very good. Of course, this applies to the domestic trade rather than to the foreign business. The latter has shown no signs of particular improvement, although preparations are being made by a number of Cincinnati machinery concerns who take advantage of the first indication of better conditions. From the South comes a good demand for wood working machinery, there there being a need of full equipments for manufacturing lumber in all of the states from which comes such a large supply of poplar, cotton wood, pine, cypress and other woods that are indigenous to that part of the country. In the Northern States there is an increased demand for all kinds of machine shop necessaries, and this applies not only to new concerns that are being started in all directions but also to old establishments that are increasing their capacity.

The Cincinnati Industrial Bureau is in negotiation with interests allied with engine building for the purpose of establishing in Cincinnati a large engine building concern. The plant, if established, will practically be a new concern, but the plan now in hand contemplates the removal of some active and successful plant alreday in operation in some other location, if one can be found that will be acceptable and come up to the requirements. With this plant as a nucleus the enterprise will be established on a large scale, and the people that will be interested in it are in the position to already insure it a large business to begin with.

The Louis Lipp Co. ran off its first heat in the new foundry on Mitchell Ave. and the B. & O. S. W. R. R. on June 18. The concern recently erected a large new plant at that location for the manufacture of plumbers' supplies and iron enameled bath tubes. The old custom of breaking a bottle of champagne in the first heat was followed and afterward the concern's entire force was given a spread.

Geo. P. Altenberg, the general foreign representative of the J. A. Fay & Egan Co., has left for Europe on an extended trip among the many branches of this concern in London, Berlin, Paris, St. Petersburg, Vienna and other points. An indication of the expectation of new business in South Africa is apparent from the fact that Mr. Altenberg will visit that locality before his return to this country about a year hence. It is believed that the demand for woodworking machinery in particular will be good coming from that part of the world, following the settlement of the Boer War.

Local capitalists are figuring on the establishment in Cincinnati of a new rolling mill. It is proposed to build the mill either on the Ohio River or on one of the railroads in a suburb of the city.

The Hilbert Machine Co., which has formally succeeded the Hilbert Freiberg Machine Co., has increased its capacity by the addition of about 3,000 square feet. The concern has more business than it can well attend to in its present quarters and will probably be compelled to farther increase its capacity in a short time.

President H. C. Hoefinghoff, of the Bickford Drill and Tool Co., says that his concern has a larger business now than it has ever had in its history. The month of June just closed exceeded any month this year and the corresponding month last year and indications are that the coming month will also be a very good one. The business already on hand would be sufficient to run the firm several months. A larger force is now working than has ever been employed. Of this business the greater part is on domestic orders.

Joseph Joseph & Bro. have purchased a piece of property adjoining the plant that it now occupies on Harrison Ave. and will erect thereon a large six story warehouse for handling old material in iron and the like in which line this concern is one of the largest in the country.

The Roach & Von Wyck Machine Tool Co. began work on the walls of their new shop building this week.

The Hilbert Machine Co., of Cincinnati, have added 2,400 feet of floor space to their plant.

The R. K. LeBlond Machine Tool Co. is enlarging its engine room and adding a blacksmith shop to its plant.

The American Laundry Machinery Co. has just shipped a large consignment of machinery to New Zealand. Louis Hermanson, the agent of the company at Sydney, N. S. W., is in Cincinnati and the order was placed by him on his arrival. Mr. Hermanson says that the duties of 25 percent on machinery have been modified to 15 and 20 percent and that American machinery can the more advantageously be shipped into his country now.

PERSONAL.

A general inspection of the plants of the American Steel & Wire Co. is being made by President W. P. Palmer, of Cleveland; General Superintendent C. L. Miller, Superintendent of the Pittsburg District J. H. Price, and Chief Engineer F. H. Daniels.

Capt. John A. Wood has been elected a director of the Monongahela River Consolidated Coal & Coke Co., of Pittsburg, to fill the vacancy caused by the resignation of Capt. W. B. Rodgers.

At the annual meeting of the United States Cast Iron Pipe & Foundry Co., held at New York last week, General Samuel Thomas retired from the presidency owing to continued ill health. He is succeeded by George B. Hayes. The other officers are: First vice president, G. J. Long; second vice president, A. F. Callahan; secretary and treasurer, B. F. Horton; executive committee, Colgate Hoyt, A. C. Overholt, E. R. Thomas and Anthony N. Brady. Three new directors have been elected: P. J. Goodhart, David Giles and W. T. C. Carpenter.

James B. Myers, general sales agent, announces that he has retired from the employ of Spang, Chalfant & Co., of Pittsburg. For the present his address is Duquesne Club, Pittsburg.

Paul L. Wolfel, of New York, chief engineer of the American Bridge Co., gave a dinner at the Hotel Lincoln, Pittsburg, last week in honor of the engineers located in the Pittsburg district affiliated with the American Bridge Co.

C. S. Street, formerly of the *Railway Review*, of Chicago, and more recently with the Dayton Malleable Iron Co., is now connected with the Wellman-Seaver-Morgan Engineering Co., of Cleveland. Mr. Street will be in charge of sales of the steel foundry the company is now building.

John A. Walker, vice president, treasurer and manager of the Joseph Dixon Crucible Co., has gone to Europe on a business trip.

T. R. Morgan, of the Wellman-Seaver-Morgan Engineering Co., Cleveland, sails for Europe July 4.

Pottsville Iron and Steel Co.

The fact has already been noted in these columns that a syndicate represented by Pilling & Crane, of Philadelphia, had been formed to acquire the Pottsville Iron & Steel Works, at Pottsville Pa. It is stated that after repairs the plant, which includes two 20-ton basic open-hearth furnaces, blooming mill, shape mill and heating furnaces, will be started up. They have been idle for several years. It has been reported that a bridge works is in contemplation by the new owners. The old bridge works at this plant is under lease to the Berlin Construction Co. The statement that Percival Roberts is connected with the new enterprise has been denied by that gentleman. Another publication credits Pennsylvania Railroad interests in the control of the syndicate. In the present scarcity of structural material the product of the plant should be in demand.

The Diamond Drill & Machine Co., of Birdsboro, Pa., whose foundry was recently destroyed by fire, announces its ability to fill all orders with little delay, and is entering new orders for immediate filling. The company is rapidly equipping a foundry in the buildings just completed for a steel casting plant, and will make gray iron castings in these until a new building can be erected for the iron foundry.

H. G. Barr, manufacturer of machine tools and special machinery at Worcester, Mass., announces that he has removed from 51 Union St. to the corner of Winona and Nebraska Sts. occupying a room 265 feet long, and with improved facilities expects to increase the business considerably in the next year. The firm name is now H. G. Barr, instead of H. G. Barr & Co.

A NEW CUTTING-OFF MACHINE.

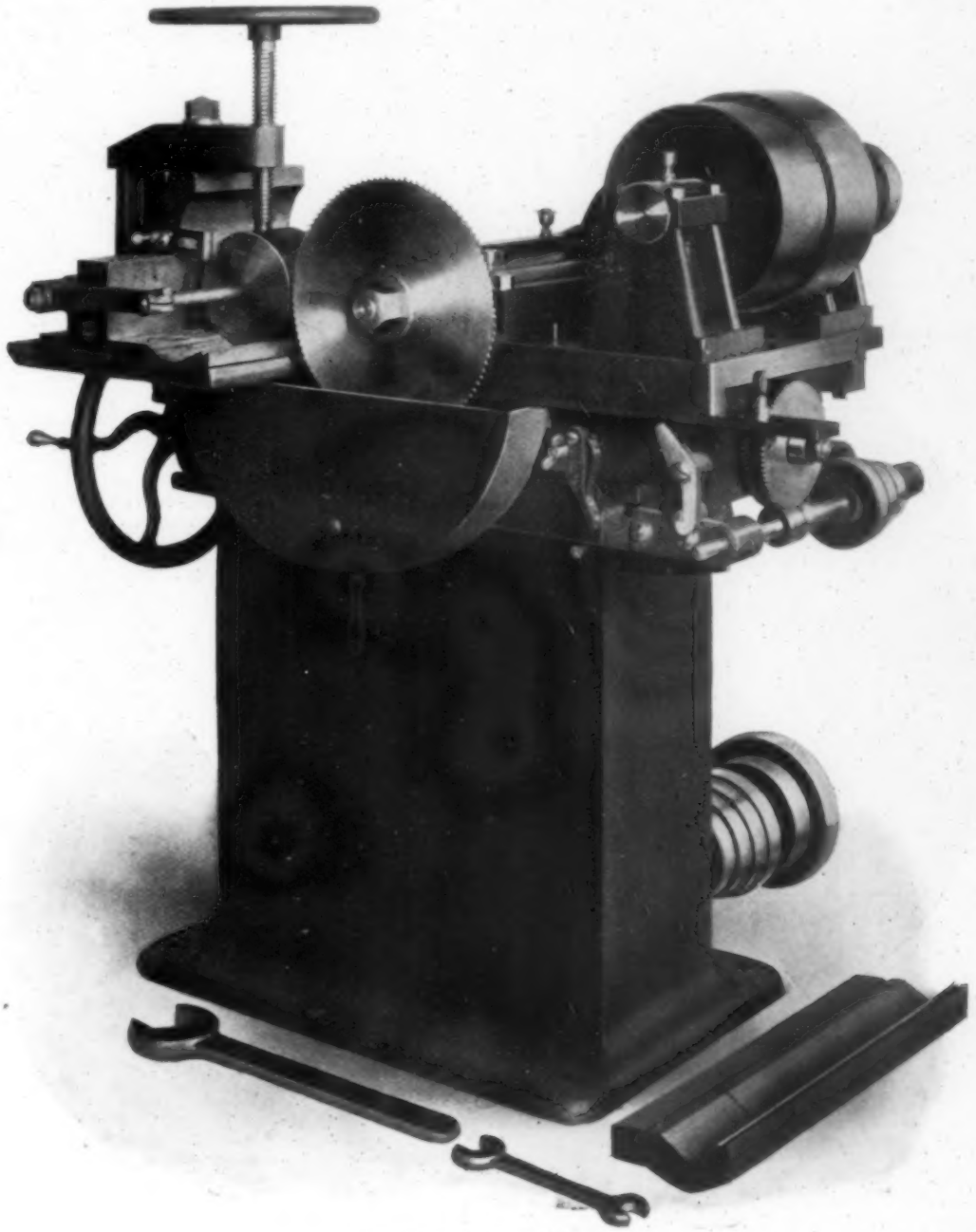
The machine shown in the illustration is designed to cut steel or iron from the bar and is capable of handling a variety of work usually done on a milling machine. The builders avoid the use of large saws which are not only fragile and expensive but are wasteful in stock required to be from 3-16 to ¼ inch thick. The machine is intended to cut large pieces with a saw 13 inches in diameter and ⅛ inch thick and thus save from 1-16 to ⅛ inch at each cut. The No. 1 machine makes one cut through pieces up to 4½ inches round or 4 inches square; from 4½ inches to 7 inches one cut is made to the center and then the stock is turned half way round to a gauge and the cut completed; for 7 to 9 inches, three cuts are made and the stock is moved twice. Nine inches is the limit with a 13-inch saw.

The saw arbor is 2¼ inches in diameter, 14½ inches long, and is driven by a spur gear powerfully connected with the driving pulley which is 11 inches in diameter by 4 inches face. These are all mounted on a traveling slide, 15 inches wide by 20 inches long, which moves forward automatically and has a quick return. The saw rotates in a trough filled with lubricant, the trough being supported by a latch and thumbscrew so that it may be easily swung out of the way for removal of the saw for sharpening, etc.

The shoe supporting the cut stock is surrounded by a channel to catch the lubricant and return it to the trough under the saw so that the oil is in constant service.

A latch at the right of the bed of the machine comes in contact with an adjustable stop on the slide when the stock is cut through and the driving worm drops out of mesh with the worm wheel on the driving shaft and the feed is at once stopped at any desired point. The feed may be set with a range of from 1 inch per minute to 1 inch in four minutes. The speed of the saw should be 13 turns per minute for tool steel and 16 turns per minute for soft steel. The floor space is 2x3 feet. The No. 2 machine cuts up to 4 inches. A supplementary shoe for small work is shown near the foot of the machine, this is serviceable in bringing the axis of the saw arbor and the work more nearly the same height when varying the size of work under operation. The writer was informed by the builders, Messrs. Nutter, Barnes & Co., Boston, Mass., that the machine had cut through 4½ inches of crucible steel in 8 minutes.

The builders of these cutting-off machines make an automatic saw-sharpening machine which has an important position in connection with the other machinery as it is essential that the saw should be ground true and that the teeth should be the right shape to obtain the best results. The automatic saw-sharpening machine can have a water attachment for wet grinding when required.



NEW CUTTING-OFF MACHINE.

Wm. J. Breen has opened a Boston office at 85 Water St., for Hugh W. Adams, of New York, agent for the Sloss-Sheffield Steel & Iron Co., Reading Iron Co. and Superior Coal & Coke Co.

END OF CLEVELAND BRASS WORKERS' STRIKE.

A demand was made early in May on the metal-working concerns in Cleveland employing polishers and other brass workers for a 9-hour day with 10 hours' pay and on May 8 about 600 men went out on strike on the refusal of their proposal. The Metal Polishers', Buffers', Platers', Brass Molders' and Brass Workers' International Union of North America, the union which was in conflict with the National Cash Register Co. at Dayton, O., last year, made the demand, which carried with it recognition of the union and the establishment of shop committees—the complete unionizing of the shops involved. The 15 firms involved had an association and at once perfected plans to oppose the strikers. Workmen were brought from other cities, and the strikers employed the usual tactics of picketing, intimidation and violence. Three concerns obtained injunctions after violence had been employed and there are now pending several contempt cases following violations of the injunction order.

Breaks in the ranks of the strikers have occurred from time to time and on Monday, June 30, large numbers of them applied for work, accepting the offer made at the beginning of the strike, namely, a 9-hour day with 9 hours' pay. The men who have been put at work in the past seven weeks are retained and the strikers are given work as fast as places are open. In most shops there are 9-hour and 10-hour days, the employes having the option, but the shorter day carries only pay for the time worked. There is no discrimination in any of the shops between union and non-union men.

New Treasurer of the American Foundrymen's Association.

WILLIS BROWN, PRESIDENT WALKER FOUNDRY CO., ERIE, PA.

New Mills of the National Tube Co.

President Schwab and other officers of the United States Steel Corporation, together with officers of the National Tube Co. and of one or two other subsidiary companies, visited plants at South Chicago, Lorain and Cleveland last week, and inspected the Conneaut docks and terminals, completing the tour of inspection which was interrupted some weeks ago by their return to the East for the bond conversion meeting of the steel corporation stockholders. The particular matter under consideration in connection with the trip was the location of the important extensions of the National Tube Co.'s plants, for which plans have been under way for some months. The discussion of the matter has centered about Lorain and McKeesport sites. No decision has been announced, and none will be given out presumably until the entire program of steel corporation improvements and new construction is published. It was expected that this would be done ere this, but meantime the bond conversion plan is held up by litigation, and the announcement may be delayed several weeks.

COAL MINERS' STRIKE IN BIRMINGHAM DISTRICT.

(Special Telegram.)

BIRMINGHAM, ALA., July 2.—No agreement has been reached on the coal miners' scale for the coming year and practically all the mines in this district are idle. The Woodward Iron Co., which has not affiliated with the other operators, has its mines still running under a special 30-day agreement. The demands of the miners mean an increase of $1 a ton in pig iron. The operators are firm in their decision not to concede the demand. Furnaces are preparing to bank, as there is little coke on hand.

Changes in Total Carbon in Remelting Iron.

To the Editor:

Mr. H. E. Field, in an excellent paper before the Boston meeting of the American Foundrymen's Association last month, affirms that I claim that carbon is always increased by remelting cast iron, and that Mr. Keep holds that carbon is always decreased. I wish to modify Mr. Field's understanding of my position. By referring to page 304, third to sixth edition of "Metallurgy of Cast Iron," the following will be found: "Total carbon is, as a general thing, increased by remelting. The amount is chiefly dependent upon the percentage of fuel used and the length of time the iron is in the cupola. Little fuel and quick melting may at times cause a slight reduction of the carbon. In the case of excessive fuel, which can give hot iron and cause slow melting, carbon may be increased. It is also, to some degree, dependent upon the silicon and manganese present. The former retards while the latter promotes the increase of carbon."

This is practically a condensed statement of the conclusion arrived at by Mr. Field, and shows that there is not the difference between his conclusions and mine, that his statement would imply. THOS. D. WEST.

Sharpsville, Pa., June 30.

Settlement with Pittsburg Machinists.

The threatened strike of the machinists in the Pittsburg District, numbering about 2,500 journeymen, has been averted by a settlement reached by 23 firms employing about 75 percent of the men in the district. The men asked for an advance of 10 percent but agreed to five. The agreement provides:

First, That the general conditions of employment now existing in the shops of parties thereto shall remain unchanged during the term of the agreement, unless changed by the majority vote of the joint committee of machinists and employers; except that double time be paid for work done on Sundays, Decoration Day, Fourth of July, Labor Day, Thanksgiving Day, Christmas and New Years.

Second, Any dispute which may arise shall, on the request of either party, be referred to a committee consisting of five members from each side, the decision of this committee to be binding, and no strike or lockout to take place pending such decision.

Third, For one year from July 1, 1902, an advance of 5 percent will be given to the journeymen machinists employed in all the shops. The agreement is to be in force until July 1, 1903, and thereafter unless 90 days' notice be given by either side.

The committee of employers was George Mesta, Isaac W. Frank, Joseph Fawell, J. Jackson and A. Snyder. About fifteen concerns that did not take part in this conference will have the above agreement presented to them and have until July 10 to agree to it. There is little likelihood of any trouble.

The Columbus Iron & Steel Co., which draws largely upon the Pocahontas field for its coke supply, advises us that it has made arrangements which have enabled it to maintain its blast furnaces in operation and it expects to keep them active.

The railway mileage of the United States has passed the 200,000 mile mark. The total track laid in the first six months of 1902 was 2,314 miles, according to the *Railway Age*, bringing the mileage of this country to 201,839.

Shop Record System of the Pearson Machine Company.

The Pearson Machine Co., of Chicago, manufactures turret lathes, screw machines, forming and drilling machines and horizontal boring machinery. The shop is run on the premium plan and the method seems to have been wholly satisfactory to employer and employes if appearances are any guide in determining the effect of such a wage paying system upon a machine factory. The machinist's time card, 2½x7 inches, is illustrated in Fig. 1 and the back of the same card is shown in Fig. 2. This form is complete in that it furnishes the full particulars of the piece of work in detail, the time estimated for the production of a certain result, the record time previously attained and the time limit. The actual time required by the workman to finish his task, with the amount of time gained, the premium rate and the premium earned are all set out in full. The card also covers the question of passable work, the term passable being applied to the work which stands the scrutiny of workman, foreman and inspector.

This Side Out.

No._____

NAME

JOB NO. PIECE NO.

DESCRIPTION

	Hrs.	Pieces
Estimated Time		
Best Previous Time		
Time Limit		
This Time		
Gain		
Premium Rate		
Premium		

Made Spoiled Rejected

REASON FOR EXCESSIVE TIME

Foreman Sign When Finished

FIG. 1.—MACHINIST'S TIME CARD.

Week ending_____ 190_

JOB CARD

No._____

THE PEARSON MACHINE CO.

Hours forward_____

DAY		IN	OUT	IN	OUT	Total
T	A. M.					
	P. M.					
F	A. M.					
	P. M.					
S	A. M.					
	P. M.					
S	A. M.					
	P. M.					
M	A. M.					
	P. M.					
T	A. M.					
	P. M.					
W	A. M.					
	P. M.					

Rate Total

FIG. 2.—BACK OF MACHINIST'S TIME CARD.

The time required for the performance of a definite task as noted in Fig. 1 is taken from record cards which contain much additional information derived from a close analysis of the work and its probable cost, etc. Such a record card is seen in Fig. 3 and is 5x8 inches. Here the number, name and the type of machine is at the head and is followed by all the particulars relative to the drawings, location and cost of patterns, together with the weight and expense of the raw material. Below this portion of the card is a section arranged for the time estimate of a number of operations upon different parts of the machine. Any number of operations up to ten are easily taken care of on the lines and ten operations usually are adequate for any ordinary piece of work, but if greater space should be desired the back of the card may be employed for the purpose or the record may be extended by interpolation between the lines on the face of the card. The columns, it will be seen, are ruled for the estimated time, the limit, or minimum period as well as the record established by actual test.

From these data the efficiency of the shop, considered as a machine, may be readily obtained. The maintenance of the actual rate of production at a level with, or closely approximating the minimum rate of production is a forcible reminder that the shop is either failing to take full advantage of its opportunities or the equipment is not capable, either by misuse, lack of repair, etc., of producing the results expected by the office. In any case an investigation is in order and the matter is promptly handled for the common good.

The comprehensive form of record shown in Fig. 3 is also given in a separate form as illustrated in a sample from the card index, Fig. 4. These cards are 3x5 inches and are limited to the several shop operations upon the one piece. These may be handily filed under number or name of the piece specified and the information can then be readily serviceable for entry upon the workman's slip when starting the work through the shop.

The shop not only makes the standard machines already enumerated, (and these by the way, have many interesting features, the design of the supporting members on the smaller machines being exceedingly neat and attractive to the eye, a very distinctive characteristic that has a decided selling force in any line of goods, irrespective of what may be thought of the utility of the idea, in other directions), the company makes special tools and machinery calling for a lot of new designs, etc. It has been thought best by those in charge of this branch of the business to undertake a few variations of the timehonored methods of doing business in the drafting room. The loose sheets of sketches and calculations, for example, are not thrown into the waste paper basket as soon as the work is out of the way or is making good progress in the shop or even on the drafting board. The sheets of data on the contrary

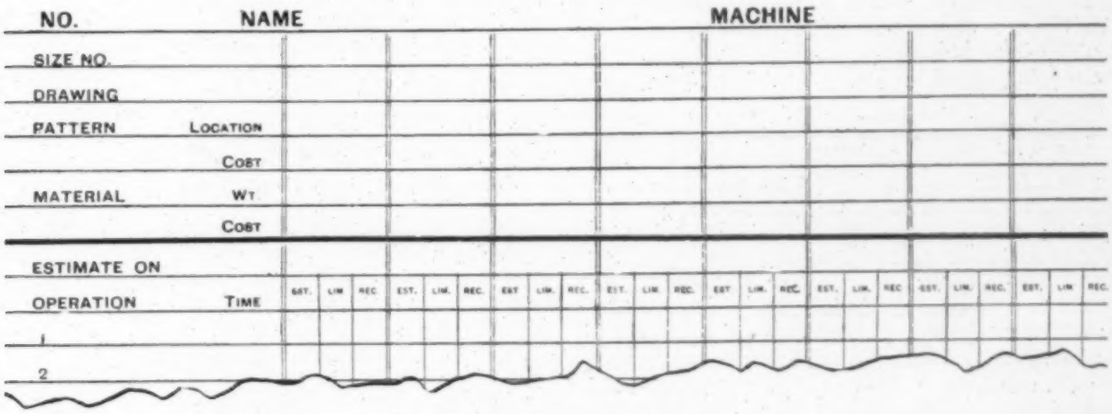


FIG. 3.—RECORD CARD.

are carefully collected and examined; if wholly undesirable, and few really approach so useless a stage, there is no question about their disposal but usually they are filed away in envelopes and a brief statement of the contents is properly indexed and the entire material is thus available at some future time and further labor and worry is decidedly lessened. The simplifying of purely routine labor—and the search for material is largely of this order—is as a rule the application of fine brains to rough work and any endeavor to avoid this result is certainly in the right direction. Such efforts are materially assisted by the drafting room card index, one of the cards being shown in Fig. 5, the original card being 3x5 inches. The card is supplied with a variety of printed headings so that a number of references may easily be made by a "check" against the appropriate term. For example, the left hand side of the card has a series of spaces for the original sketch, the

tracing, print, etc., and a "check" mark against any of these shortens up the time required in making a complete record The rest of the card is self explanatory and will be seen to have a most comprehensive range.

The drafting room is constantly handling many special devices (some of them may never enter the field of manufacturing pure and simple as the one appliance may fully meet that particular demand and the exigencies of the case may not call for its use elsewhere) and follows a ready-to-wear system in dealing with many orders, particularly the order needed in a hurry and probably of the foregoing classification. In that case the making of blueprints is discouraged and the pencil sketch is attached to a board with a protecting cover of thin celluloid. The latter is thin enough to permit

NO.	NAME	MACH.			
	OPERATION.	EST.	LIN.	REG.	
1					
2					
3					
4					
5					
6					
7					
8					
9					

FIG. 4.—CARD INDEX TO PIECE OPERATIONS.

the ready reading of the drawing and at the same time act as shield against the inevitable grit and grime of the shops. The celluloid is firmly held in position by strips of wood at the edges and several drawings which had run the gauntlet of shop service were in excellent condition and had all the clean appearance of a newly finished sketch. This method saves a lot of time in tracing and on a rush job is a valuable expedient.

Among the many devices seen in the shop, the following are two of that class of machine conveniences which on account of their simplicity might be overlooked. Fig. 6 is a boring tool for use in the turret of a screw machine. The stock or shank fitting the hold in the turret, is seen at A; this is turned down at the end for a hardened steel ring B and the projecting portion of the stock has a slot C cut out for the cutter D. The end of the tool-holder is tapped for a set-

MACH.	NAME		
DRAWING NO.	PIECE NO.	ORDER NO.	GENERAL DRAWING DETAILS
DRAWER NO.	RACK NO.	CUPBOARD NO.	ENVELOPE
ORIGINAL	DRAFTSMAN	SIZE SHEET	DATE
TRACING	VIEWS		
PRINT			
NEGATIVE			
SKETCH	REMARKS		
SHOP CARD			
	GUIDE CARD		

PEARSON MACHINE CO.

FIG. 5.—DRAFTING ROOM CARD INDEX.

screw E. The back of the cutter D has a projection to fit the bore of the steel ring B and when the cutter is slipped into position it is firmly held by the retaining ring, the edges of the slot and the pressure of the setscrew from any movement whatever. The bore of the retaining ring is of course standard and this not only permits cutters to be changed with ease as there is no matter of adjustment to worry the workman but it will be seen at once that the toolmaker can keep such tools in stock for instant service and thus be prepared for emergencies, either caused by ordinary wear or any unusual misfortune with the machine.

Fig. 7 is of an even less complex character and it is illustrated rather from its extreme simplicity than from any other cause. It is a simple combination of a collar screw, a cutting-off blade and a piece of cast iron. The device is, however, all that is necessary and in service fully meets the working requirements. The collar screw C has sufficient bearing in the block A, and is correspondingly rugged, to stand the pressure brought to bear by the operation when making an adjustment

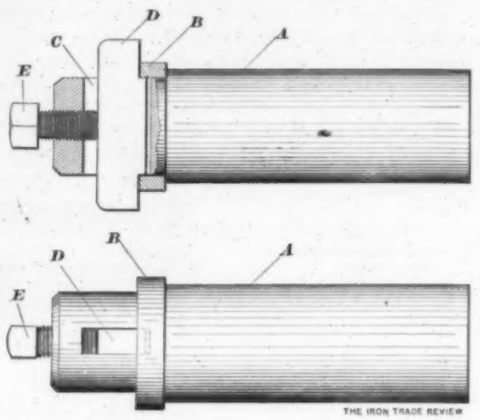


FIG 6.—ELEVATION AND PLAN OF BORING TOOL FOR USE IN TURRET.

of the tool after regrinding, etc. The treatment by the operator is probably the most severe that is brought to bear upon any toolholder but in this case the cutter blade is so rigidly held by the groove in the block that the collar screw has really very little to do and the matter of pressure is thus

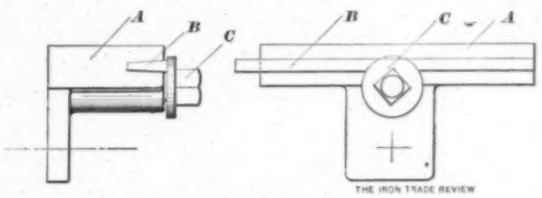


FIG. 7.—PLAN AND END ELEVATION OF CUTTING-OFF TOOL AND HOLDER.

a measure of the shop sense of the workman. At any rate the tool can be rigidly held with very little pressure by the screw and the simplicity of the whole scheme is very suggestive of the plain matter-of-fact method in which business is handled at the works of the Pearson Machine Co.

TRADE PUBLICATIONS.

The Jeffrey Mfg. Co., Columbus, O., has prepared a 6x9, 48-page, pamphlet treating of their line of screening machinery. These screens handle all sharp and gritty materials including bone ash, coal, trap rock, clay, ores, quartz, graphite, etc. In addition to a variety of information in regard to the dimensions, capacities, etc., of screens and screening plants, the publication contains a number of testimonials to the merits of these products. The work is well illustrated and is designated as Catalogue No. 69.

The electrically operated stationary and portable air compressors manufactured by the Christensen Engineering Co., Milwaukee, Wis., are illustrated and described in Catalogue No. 51. These compressors are specially designed and self-contained units of the most compact form, the detail parts made from jigs and templates and are therefore interchangeable. The working parts operate in a bath of oil and an automatic governor stops the motor as soon as the air pressure reaches a predetermined maximum and starts it when the pressure is reduced to a minimum; electric power is therefore used only when work is being performed.

Wyman & Gordon, manufacturers of drop forgings, Worcester, Mass., have added another to the series of booklets on master craftsmen. The current issue is entitled "A Short Story of James Nasmyth" and contains a copy of the portrait of this eminent engineer etched by Paul Rajon after the work by G. Reid, R. S. A. The essay is necessarily brief but affords a vivid and attractive portraiture of the striking per-

sonality who was at once a success as a craftsman and a man of affairs; who was in effect so brilliant an exponent of that profession of which he is reported to have said "Engineering is the application of common sense to the use of materials." The three pages containing a list of crank shaft forgings, dimensions, etc., and a half-tone of the plant at Worcester, are unobtrusive and the general effect is not lacking in dignity and force, indeed a most pleasing variation from the hackneyed trade circular.

The Erie City Iron Works, Erie, Pa., has a new general catalogue setting forth the lists of sizes of engines and boilers; these lists are the outcome of an experience of 60 years. The catalogue offers a wide range among many different styles of engines on the ground that they are valuable in direct ratio to their earning capacities. In the one case close regulation is necessary for the character of the work to be done, in another economy of fuel is essential or it may be both economy and close regulation, while in other cases capacity is wanted and consideration of fuel is of no account. The 48 pages are freely illustrated.

Book 2, of the National Oil Burner & Equipment Co., St. Louis, Mo., submits a description of an automatic system of feeding fuel oil to boiler and other furnaces. Any vertical, portable, small horizontal or flash boiler is said to be capable of equipment with these crude oil burners, without the necessity of removing the grate bars and that the change from coal to oil, or vice versa, can be made in a few minutes.

The Fenn-Sadler Machine Co., Hartford, Conn., has a circular of a new bench lathe with a swing of 7 inches and taking 18 inches between the centers. The boxes are made of a special high speed composition metal and are split to take up any wear; the bearings are parallel and the boxes draw in on a taper. The draw bar has a 33-64-inch hole through it allowing ½-inch rod to pass through it easily. The compound rest has a travel of 6 inches in one direction and 2 inches in the other and will swing to any angle.

The Eureka patent spraying machine is exploited in a small catalogue issued by the Eureka Pneumatic Spray Co., New York. The apparatus is manufactured in three sizes for metal lacquering, painting, japanning, wood varnishing, foundry uses, etc. Cores and dry sand molds may be faced with the machine and the same device may be used for a hand blast in place of the old time bellows. A number of facsimile testimonials are submitted with the descriptive matter.

The medium speed automatic cutoff engines manufactured by the Erie Engine Works, Erie, Pa., form the subject matter of a catalogue issued as a supplement to the large illustrated pamphlet treating of the throttling engines or boilers made by the same company. The present publication is embellished with some excellent half-tones and the "Lawrie" governor receives an extended and careful treatment.

Storey & Sons, Mount Holly, N. J., have some folders descriptive of lathe and planer toolholders. The more recent improvements in this line of convenient tools avoids the use of setscrews or bolts and the cutter may be instantly released from the holder by loosening the tool post screw. The same firm manufactures a toolholder which retains the cutter in position by means of a bolt, and should this break the piece will drop out and another can be inserted without tapping or drilling. Both devices are made in a number of sizes.

A number of circulars have been published by the Webster, Camp & Lane Co., Akron, O., upon wire rope haulage machinery, ore cars and cages, Akron engines, direct acting engines, high geared hoisting engines, self contained geared hoists, electrically driven hoists, etc. These are all 6x9, have a generous supply of full-page illustrations and the descriptive matter is extensive and clear.

"Engine Lathes" is the title of the Catalogue E sent out by Schumacher & Boye, Cincinnati. The catalogue is standard size, 6x9 inches, and has a series of illustrated descriptions of various standard lathes, together with views of box and other aprons, countershafts, turrets, chucks, etc. Sectional views are shown of the new arrangement for feed and screw cutting. This device for example permits the cutting of all U. S. standard threads from 2 to 56 per inch on the 18 and 20-inch lathes without changing a gear; feeds are four times the threads per inch. The 22 and 24-inch lathes cut all U. S. standard threads from 1 to 28 without changing a gear and feeds four times the threads per inch.

The Northern Engineering Works, Detroit, Mich., submits a selection of the types of standard cranes in most frequent demand in Catalogue No. 15. The firm manufactures many styles not shown in the publication and space has been given to as great a variety of forms as possible. These cranes are illustrated as hand operated as well as driven by direct and alternating current motors, with pneumatic action, single and double girder, trolley, pendent winch, hand truck, etc.

Under the general heading of "Air Compressors" the Herron & Bury Mfg. Co., Erie, Pa., issue several circulars treating of "straight line," "center crank" belt driven air compressors and air receivers. These are manufactured in a variety of sizes and are submitted with complete specifications.

We have Catalogue No. 205 as well as a souvenir circular of the plant of the Studebaker Bros. Mfg. Co., South Bend, Ind. The latter is profusely illustrated with half-tones detailing the pioneer work during the half century growth of this mammoth factory together with interesting mention of noteworthy facts and figures about present day conditions.

"Coaling at Sea" is the title of a well illustrated description of the Lidgerwood-Miller marine cableway as installed on the U. S. battleship Illinois by the Lidgerwood Mfg. Co., Liberty St., New York. This remarkable addition to the essential equipment of warships greatly increases their radius of active operations and in this respect the improvement has not only improved the general naval efficiency but it has very largely cut down the number of absences from the fighting line. The system has some very interesting features from the standpoint of mechanical engineering as well as its purely naval side.

The Franklin Portable Crane & Hoist Co., Franklin, Pa., has a catalogue of the different sizes of their product. The machine is shown in detail by some neat half-tones and the convenience and capacity are very clearly portrayed. The simple device by which the crane is maintained in a rigid position on the floor while hoisting or lowering a load is very effective and free from complication. The machines are roller bushed.

A booklet illustrative of the American air compressor has been prepared by the American Air Compressor Works, Havemeyer Bldg., New York, and is mainly devoted to the Clayton type of compressor. A complete catalogue is in press which will embody valuable data and other descriptive matter of the full line of gas pumps, vacuum pumps, tar pumps, air receivers and hoists as well as compressed air tools and appliances manufactured by this company.

A circular has been issued by the Indianapolis Brush & Broom Manufacturing Co., Indianapolis, Ind., devoted to the "Capital" broom. This is particularly adapted for the rough treatment of factories, steel and iron plants, foundries, railways, warehouses, etc.

We have received from the Reese-Hammond Fire Brick Co., Bolivar, Pa., the third of their quarterly "Indian" calendars, this one covering the months of July, August and September. The calendar is on beveled board and bears a reproduction of "The Watering Place" in photogravure.

The Nernst lamp is thoroughly described and illustrated, with a price list covering the several sizes and parts, in a finely printed catalogue prepared by the Nernst Lamp Co., Pittsburg. The publication contains many beautiful specimens of the illustrator's art and the story in detail of Dr. Nernst's ingenious application of his discoveries in the relative conductivity of refractory earths at different temperatures is decidedly interesting.

Circulars 22, 23 and 24, issued by the United Telpherage Co., New York, cover the application of telpherage as applied to the handling of trunks and baggage at railway stations, cross country lines and the use of the system in a paper mill. These circulars are sent out in continuance of the company's intention to furnish occasionally pictures and descriptions of the introduction of telpherage in various industries.

The Lorain Machine & Forge Co., of Lorain, O., recently incorporated for $10,000, has been organized by the election of the following officers: President, P. Brunk; vice president, J. H. Heyer; secretary and treasurer, F. C. Whitmore. The company has purchased a site 50x200 feet with a two-story brick building 35x75 and will build an addition 35x50 feet to be used for forge room.

The Jones & Lamson Machine Co.'s Plant and Methods.

Springfield, Vt., is located among the famous hills whose repute for landscape beauty has gone far beyond the borders of the State. The town is reached after a winding trip on the Rutland Railroad which zigzags to and fro over the dividing line into New Hampshire, the visitor traveling the last six miles by electric car. One is naturally impressed with the peculiar environment and it is a matter for some speculation, what may have been the influence of so secluded a position among the hills of New England. The city plant with its proximity to other competitors does not seem to possess the opportunities for mutual acquaintance of employer and employed found in the small isolated country town. Mutual dependence and good feeling may exist of course in city or in country, but the city conditions would not appear so conducive to the friendly relationship found in the country shop and its inmates. The purchase of land by the workmen in the immediate neighborhood of a manufacturing plant is not so feasible in the one case as in the other and hence the permanent attachment is not so likely as where the employe has a direct interest in prosperous conditions around the plant as well as in it. This is but one item out of the several that might be cited on the purely labor side of the question when comparing a large city with one of the size of Springfield, with some 2,000 inhabitants.

Manufacturing as a general proposition would seem handicapped by the conditions of the country and the consequent seclusion from city facilities. With the exception of one characteristic, however, the Jones & Lamson plant exhibits all the evidences of a modern shop manufacturing machine tools. The peculiarity referred to is fairly well known to mechanics, and it is indeed a rare thing to find a machine shop making but a single size of the one type of machine. It is possible to conceive of a machine built in the one size because the manufacturers were at the outset of their work and wished to con-

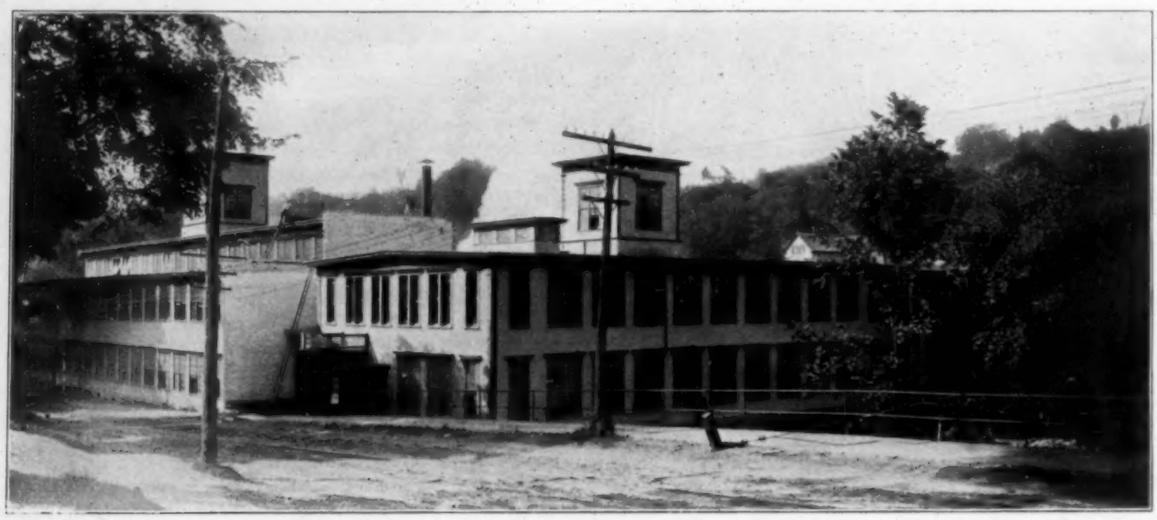


FIG. 1.—OFFICE AND SHOPS OF THE JONES & LAMSON MACHINE CO.

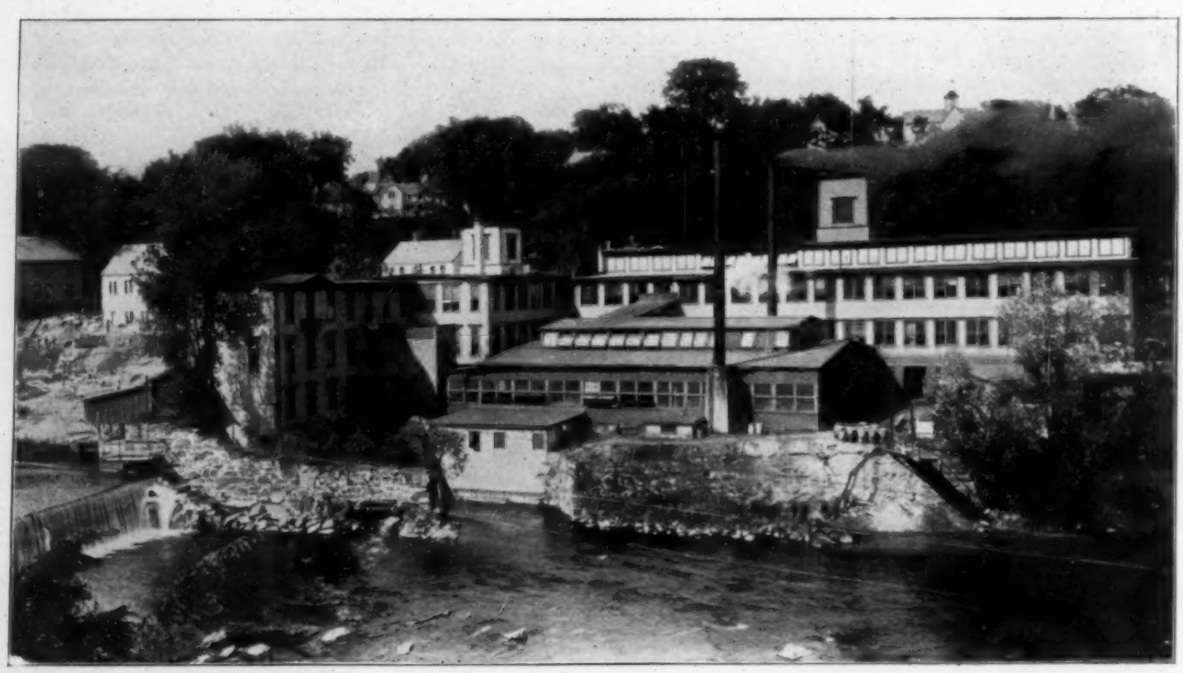


FIG. 2.—ANOTHER VIEW OF THE JONES & LAMSON MACHINE CO.'S SHOPS.

centrate efforts upon the production of a first design. But the demand for machine tools soon varies the product in the vast majority of cases and the output, even if confined to the one general type (as lathes, or it may be planers) is modified in range to meet the individual taste of the purchaser, and new sizes spring into existence. Now the Jones & Lamson Machine Co. seems never to have gone astray from that first concentration upon the one size of machine. It met with a favorable reception and was introduced by practical men familiar with machine shop requirements and the Springfield plant has been enlarged, improved equipment designed, built as well as purchased. But the original necessity for every facility being introduced for the advantageous making of the one thing has never been removed; and today the force is actively at work on the old task, meeting the demand for 2x24-inch turret machines.

The Evolution of the Jones & Lamson Machine.

The Jones & Lamson Machine Co. is one of the older machine tool builders of the country and the writer has seen lathes and other tools built by the firm prior to its removal from Windsor, Vt., to its present location. The old shop formed part of the establishment at Windsor, now manufacturing screw machinery under the title of the Windsor Machine Co.; and the old company in the thirst for trade ran the industrial gamut from lathes to guns in its productive efforts. It may be a debatable point, where the original automatic turret machine was built; but the Jones & Lamson Machine Co. built a turret machine in which the turret turned automatically with the backward motion of the slide, in the year 1855. This machine was probably designed by Fred W. Howe, who was an able inventor and connected with the company in its early history.

Second only in importance to the invention of this machine was the work of H. D. Stone who was in the employ of the company in various capacities from some time in the '50's until the year 1888. The development of the machine during that period was the work of Mr. Stone. His first step was to place the automatic mechanism for turning the turret under the turret head, free from exposure to chips. The advantage of the turret machine in the general work of the shop was soon so apparent that the application of the tool to larger field of usefulness was attempted and the turret slide was improved by the addition of a power feed and rapidity of changing the driving mechanism was effected by the application of clutch back gears to the headstock. A precise and authoritative statement regarding the right of ownership to many of the earlier inventions in the development of the screw machine is difficult to make, but the writer is assured on very good grounds that with the exception of the important work of Mr. Parkhurst, of the Pratt & Whitney Co., in designing the Parkhurst wire feed, Mr. Stone was the leading designer of several details now considered essential features of the modern machine.

The inventions of Mr. James Hartness were first put into use by the Jones & Lamson Co. in 1888 and in the following year Mr. Hartness took charge of the shop as superintendent. After making a few changes in the original machine he designed the flat turret and its success has made it possible for the company to enjoy the unique distinction of being the only machine tool company building only one machine and but one size.

The Shops at Springfield.

The present plant at Springfield is shown in Fig. 1, the office being at the nearest corner of the building. At the extreme left, just out of range of the camera, is the shipping department with a spur track connecting with the electric road from Springfield to Charlestown, N. H. Shipping rates might at first be thought high, but further inquiry in a large Eastern city on a main line of railroad indicated an equal tariff for of course a much shorter haul. At the right of Fig. 1 the foundations are completed for a new building 150x75 feet, 3 stories high, of brick and having an extension for a power house. Fig. 2 is a view of the plant from the opposite bank of the Black River. The river is an uncertain element as a source of power and the several weirs and dams might long ago have been superseded by the one reservoir and a canal could greater reliance have been placed upon the stream. As it is there are a number of dams situated but a short distance apart through the manufacturing district, the stream probably dropping some 40 feet in passing through Springfield but the available height at the Jones & Lamson plant is not more than a dozen feet. A steam plant is therefore a necessity and the new building will have a complete electrical equipment. The view in Fig. 2 was taken while the work was in progress at the new plant, as may be seen at the left of the illustration. Both these illustrations depict the works surrounded by scen-

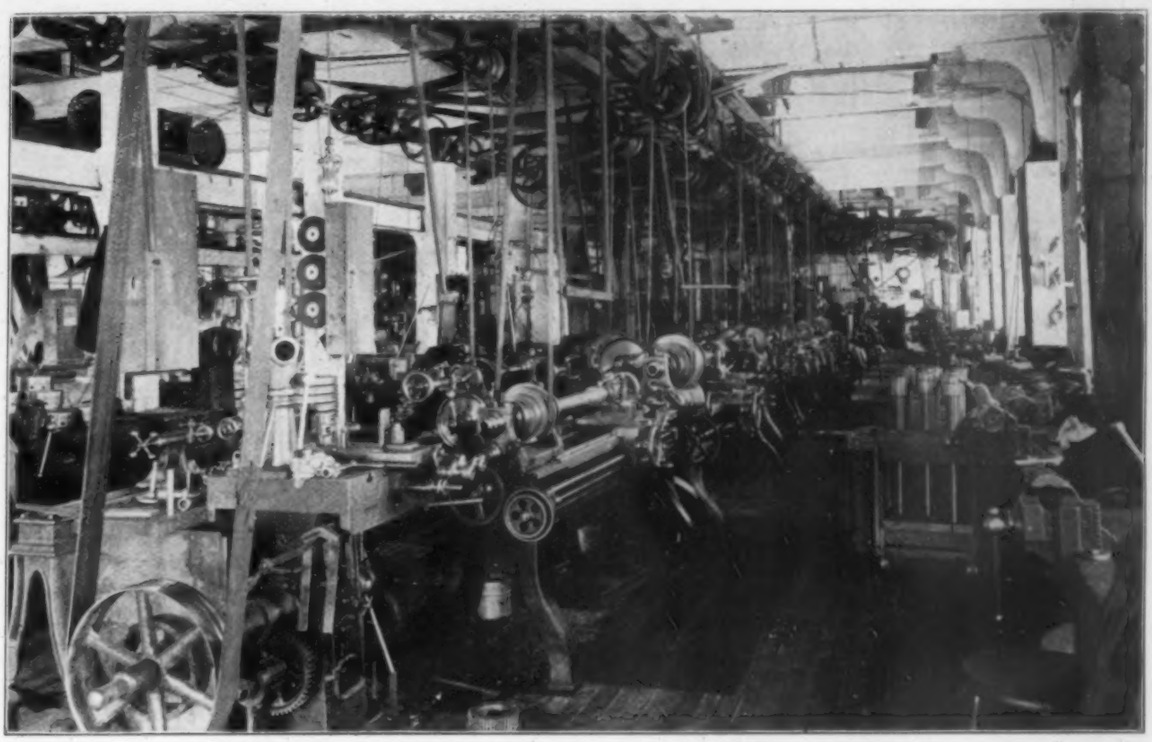


FIG. 3—HEAD ASSEMBLING DEPARTMENT.

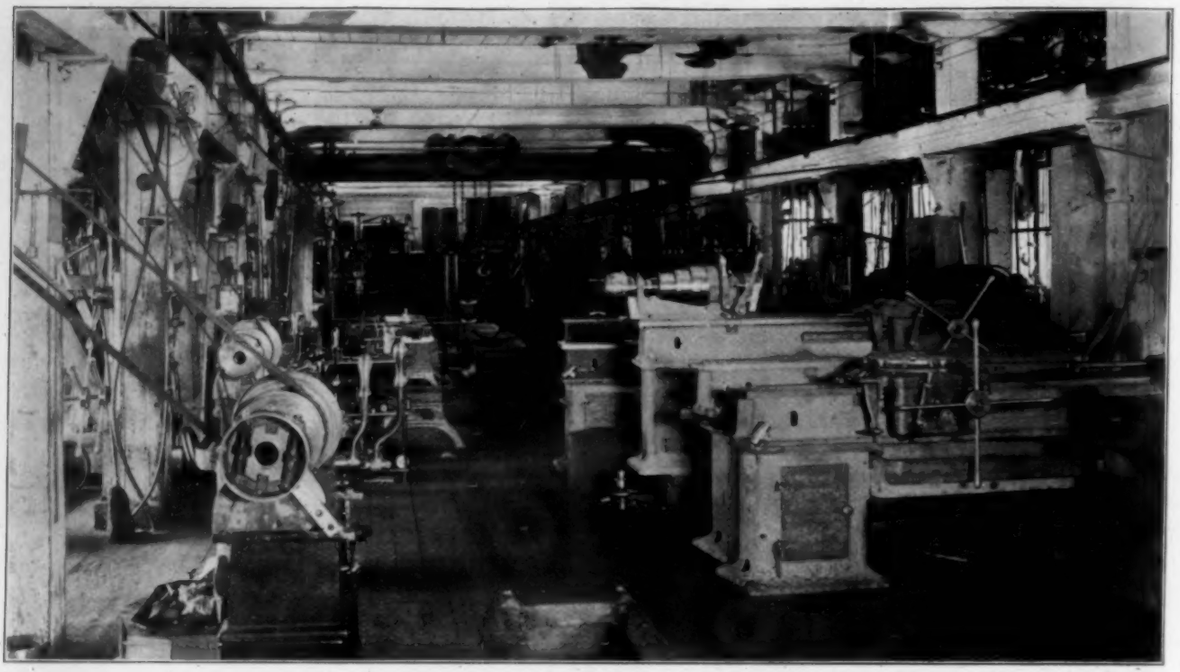


FIG. 4.—AN ASSEMBLING DEPARTMENT.

er of an attractive type and peculiarly interesting to the visitor from a less striking neighborhood.

The manufacture of the one size of machine permits a free use of jigs and fixtures in every detail. Where another manager might hesitate at the investment of money in expensive equipment there has been here no lack of a spirit to gain whatever advantage might be drawn from special tools. A variation in design increases the amount of tools and unless the demand will permit the production of the machine in quantities, it becomes a matter for careful consideration whether the special need has sufficient weight for unusual equipment. There can be no doubt of this where the one product is of an unvarying and permanent character, consequently the application of jigs and fixtures to the different operations is carried out generously. The headstocks are assembled in the department illustrated in Fig. 3 and the entire machine is brought together in the assembling department shown in Fig. 4. It may be said here that the machines are sent through the works in lots of ten and that some 2,000 of them have been manufactured to date. At the present time there are 225 men employed, a number of them at work evenings, and the rush of business has compelled

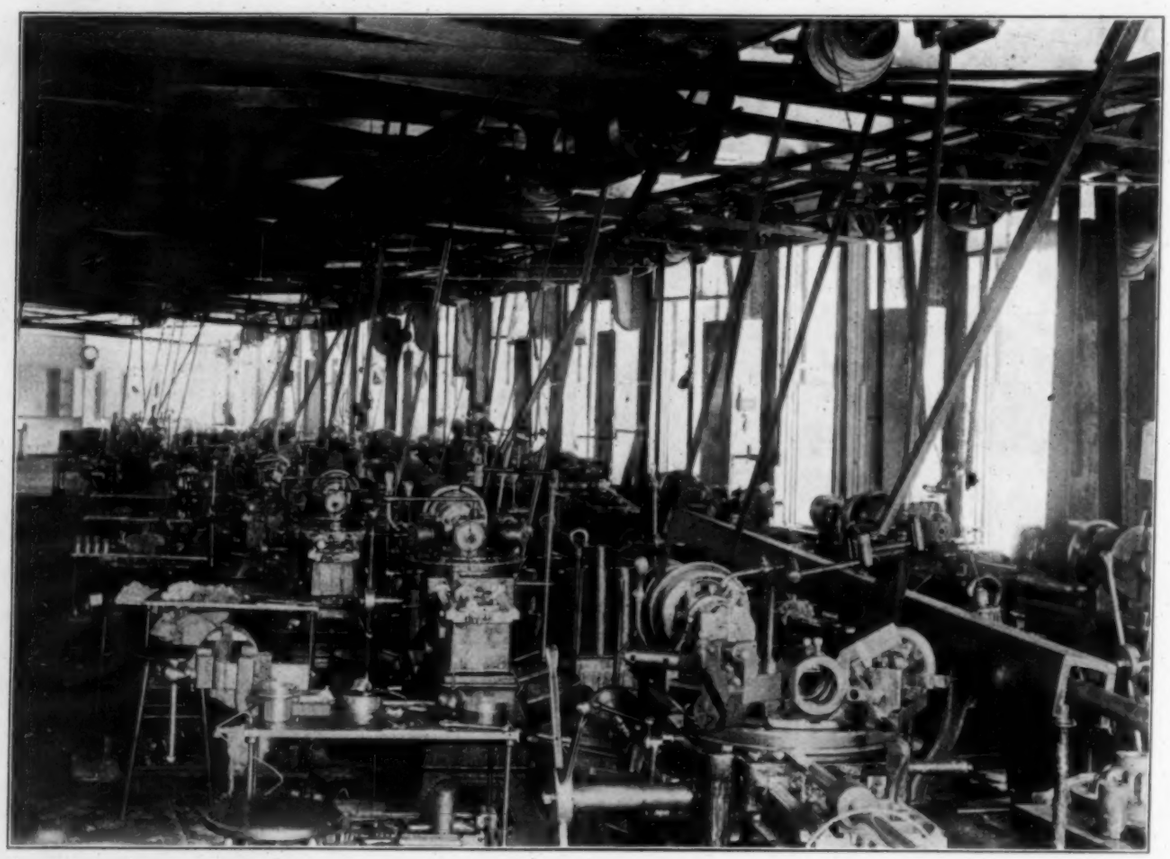


FIG. 5.—A GROUP OF 2 X 24 FLAT TURRET MACHINES.

some of the product to be handled by contract outside the plant.

The flat turret lathe directly competes with the engine lathe and the writer must say that the firm does not seem to have any hesitancy in carrying its faith into effect in its own work. A machine shop without engine lathes would be an attempt at a monarchy without the aid of the king of tools but the Jones & Lamson Machine Co. has few lathes compared with the host of flat turret machines, and that brings us back to the purpose of the tool in manufacturing. There is no necessity here to describe the machine which is known to shop men everywhere. The roller feed actuated by the power of the machine, the improved chuck, the proximity of the locking pin to the cutting tool, the simplicity of the tools—all these are familiar. The possibility of doing work without marking the finished surface when running back the tools, after making a cut, and the simple form of the cutting tools suggested

FIG. 6.—AUTOMATIC DIE DEPARTMENT.

many possibilities when the machine was first introduced. Here in Fig. 5 is a group of 2x24 machines which are steadily engaged on stock work within close limits.

Features of the Die Department.

Perhaps the most interesting peculiarity of a notable product is the means employed for the production of screw threads. The long experience of Mr. Hartness with taps and dies had taught him the difficulty of obtaining accurate die-cut threads and that the lead of many taps would be far from perfect. The automatic die department of the Jones & Lamson plant is therefore a visible expression of the progress attained by the firm in the production of accurate thread tools. This department is illustrated in Fig. 6 and there are here some indications of the originality of the designer in casting machine shop precedent aside and striking out new avenues to the attainment of his purpose. For example, in many other shops, the average die is made from what may be a very ordinary tap; and this in turn the copy of a lathe lead screw. At each point there is a chance for error and a probability that these inaccuracies accumulate at each operation. In this department is a group of milling machines and forming lathes: each is a special machine with all the aids to accurate work that a thorough examination of the requirements would suggest.

The ordinary way of making a die starts out with the cutting of a tap, while the Hartness plan is based on milling the threads in the die at the beginning, the milling cutters being spaced by a screw and index on a lathe provided with relieving mechanism to give the proper amount of clearance to the teeth. There is no chance here for the wear that may impair the accuracy of the lathe lead screw, and the results are highly satisfactory. One of these forming lathes is at the left of Fig. 6, and at the rear of the illustration is a line of special milling machines equipped with means for recording to a nicety all angles and positions of approach of work to the cutters. The process of forming the teeth of the chasers in the die heads is such that the front or the cutting teeth have an ideal clearance but the back teeth have no clearance and take a bearing on the work a trifle back of the face of the chaser forming substantially a lead nut which rides on the thread produced by the front teeth and in this way governs the lead of the screw. The milling cutters used are 2½ inches in diameter regardless of the size of the screw to be cut by the chasers, the milling cutters are ground frequently on the special grinders seen in Fig. 6.

Careful attention is paid to the angles at which the chaser blanks are presented to the milling cutters both for clearance, rake, etc., and a long experience with screw cutting of widely varying sizes has given the men in charge a thorough knowledge of the precise angles at which the cutters will do the best work—a matter of practical acquaintance with die cutting results rather than of mathematical calculation. It may appear that this is an expensive way of making die chasers and it cannot be denied that an amount of care is required in the production of these cutters that is out of all comparison with the tap-made die. But the dies cut rapidly when they are finished, while the tap-made die has a burnishing action which is slow cutting and opposed to the shop sense of every machinist. The one costs more than the other at the start but that is not the whole story by any means. It is all a question of accuracy; and it must not be forgotten that the same pocket book which pays for the labor at the screw machine also defrays the expense of assembling the machines into

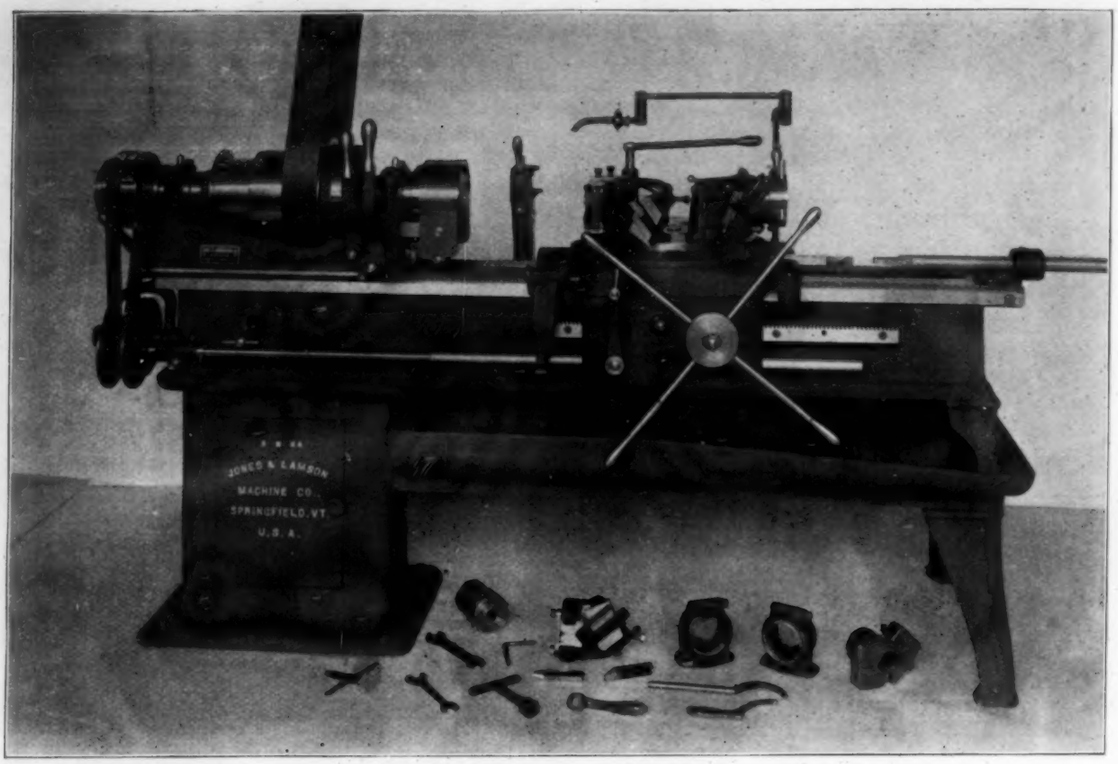


FIG. 7.—THE NEW FLAT TURRET LATHE.

which the turret machine work enters. This is, of course, on the assumption that when the work comes to the floor absolutely correct there is a reduction in the time required for setting up and this object is the goal toward which every shop manager is striving—to so have his machine work produced that the process of assembling the parts shall not be fitting them together.

The machine shop does not fail to exhibit many other features of note to the eye of the mechanic and the same purpose in concentration of effort is found in other tools than the flat turret lathe. The planers are employed on multiple work and one of these tools was finishing up four lathe beds at a time in eight hours. The lathe beds having the upper flange undercut by means of the supplementary side heads cut simultaneously with the regular heads on the cross rail. In order to have these power driven in each case a chain and set of sprocket wheels at both ends of the cross feed shaft communicates power to the screws on the side heads and four cuts are kept constantly at work.

The company has in the shipping department a reminder of the open door and crane illustrated in our recent description of the National Cash Register Co.'s plant at Dayton. The crane running through the shop, passes over a couple of separating doors to the outside of the plant where the machines are loaded on the cars for electric transportation to the main line of railroad six miles away. A vertical swinging door of

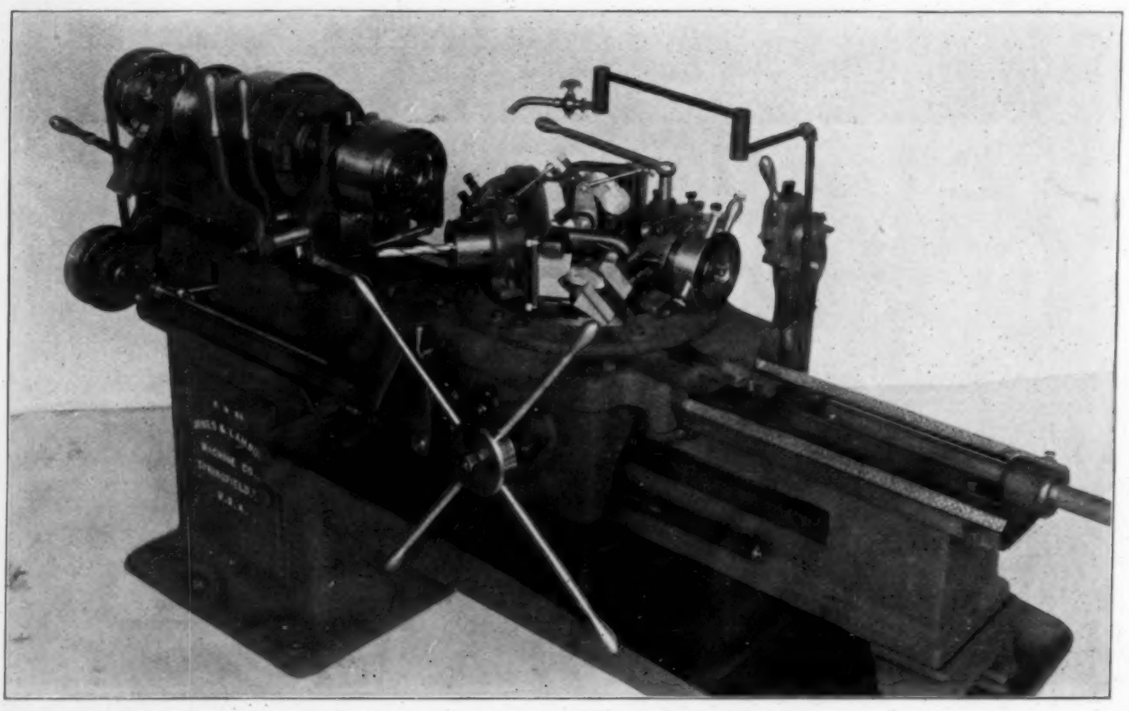


FIG. 8.—ANOTHER VIEW OF THE NEW FLAT TURRET LATHE.

relatively little depth compared to the width permits the passage of the crane at each division of the rooms, etc.

A New Frictional Feed Gearing.

The firm has recently perfected a frictional feed gearing which possesses some interesting points. The later machine is illustrated in Fig. 7, which shows the machine in elevation,

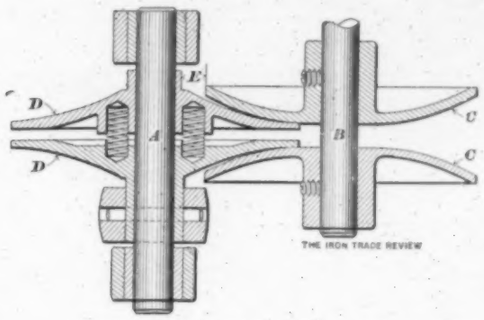


FIG. 9.—SECTIONAL VIEW OF FRICTIONAL FEED GEARING.

and in Fig. 8, which gives a view of the tool from above, showing the turret tools in position. The most unusual feature will be seen in the connection of the feed shaft at the headstock. The arrangement is more clearly illustrated in the line engravings in Figs. 9 and 10. The pulley on the shaft A is driven by a belt from the cone spindle and the motion is communicated to the feed shaft B by means of discs. The discs on the shaft B are permanently fastened in position by blind screws and the flanges C C grip two other discs D D, the latter having springs between them to force them apart and ensure a good frictional contact with the discs C C. The curves are circular arcs with different radii for the two sets of discs, and the design is so worked out that it is but necessary to move the two shafts together or asunder the distance E, about 5/8 inch, to obtain the entire range of the speed variation. The line of contact moves in a magnified ratio in comparison with the actual distance by which the space between the shafts is increased or lessened. This friction gearing gives a possible variation of from 14 to 120 and the nicety with which the speed graduation may be changed will suggest an availability in the adjustment of the feed to the cut which will be found very useful in flat turret practice.

The manner in which the device is attached to the machine is seen more definitely in Fig. 10, the hand lever, through a cam, forcing the discs into closer union or apart as may be required, the arm swinging through the desired arc without any material influence on the belt tension. The reference letters are identical for the same parts in each of the line engravings.

Elmer L. Wood, superintendent of the plant, and J. W. Bennett, secretary of the company, who has general supervision of the office force, are firm believers in the desirability of as simple and direct a method of obtaining results as can be devised. Neither of these gentlemen has any hesitancy in going across lots if as good an outcome is to be had and there is no tendency to the continuance of any awkward custom about the plant simply because it is entrenched behind the walls of established usage. Any method must there have inherent worth or the scrap heap for useless ideas simply aches for it. This is but the expected end after all to the training inculcated with the development of the Hartness machine and it follows that the office and shop equipment, overworked as the latter undoubtedly is at this time, should reflect a strong likeness to the close application to business seen in that ingenious production.

A system of management shorn of any unnecessary attachments for the sake of style or of mere individual fancy prevails and the clerical force seems small in proportion to the dimensions of the plant. It is, however, adequate to the occasion and its efficiency may largely be ascribed to the simplicity of the mechanism employed.

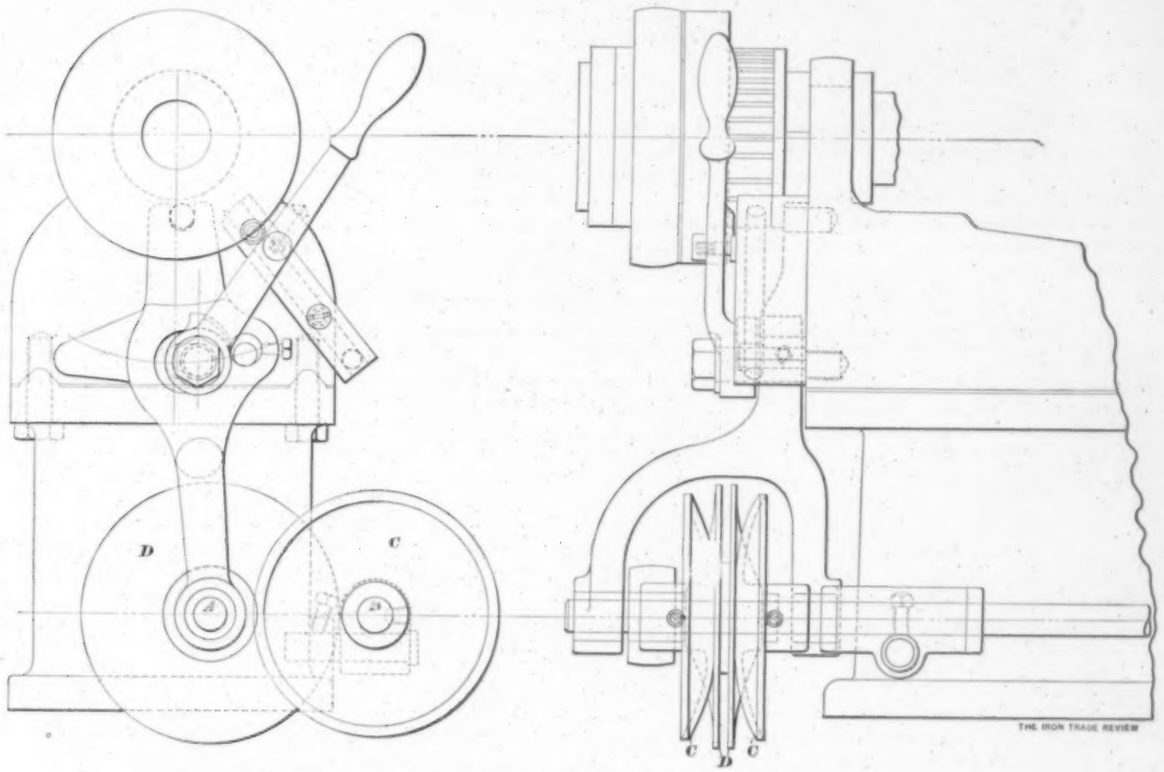


FIG. 10.—END AND SIDE ELEVATION OF HEADSTOCK AND FRICTIONAL FEED GEARING.

Shop Order and Other Forms.

A time card system is followed which is almost identical with the one illustrated elsewhere in this issue in connection with the Pearson shop. The one machine enables a greater approach to simplicity than would be admissible in almost any other machine shop and the possibilities of pruning the methods to their fewest terms are closely utilized. The parts of the machine are numbered consecutively and this in itself lops off a mass of symbolism that forms a necessary nuisance in many other places. The pieces are numbered from unity upwards, the advantage of a natural order being in this instance

superior to the decimal classification which in turn becomes a necessity when dealing with varied sizes and types of machinery.

Fig. 11 shows the shop order and shipping form. This covers all the details of the order and is retained in the office, while the items enumerated on the face of the blank are filled out as they come to light. When the order is finally shipped the completed form is filed away with others as a record of the machine, etc. Some of the entries may be made at the outset when the order is received at the office. The billing and shipping directions, details of the order, date of delivery of order to factory, name of salesman, etc., appear. This order and shipping blank is 5x8 inches.

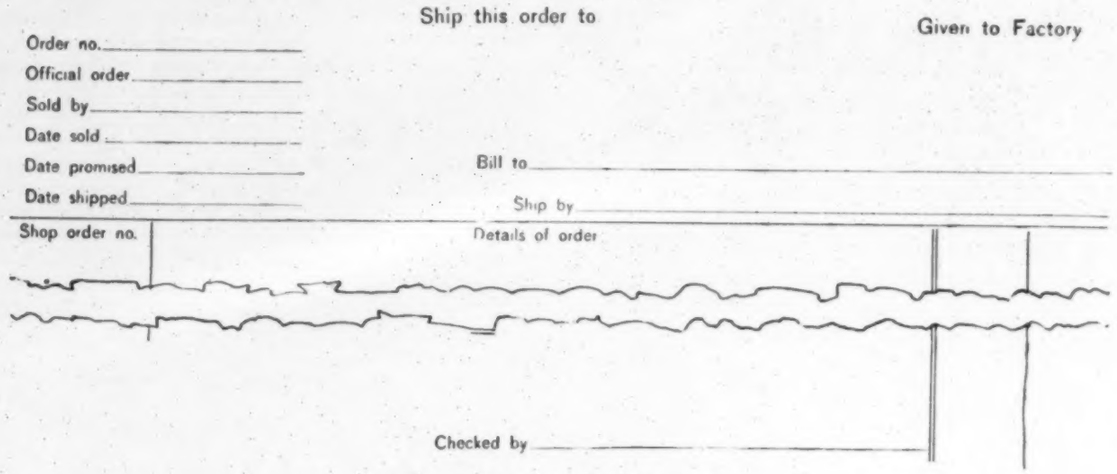


FIG. 11.—ORDER AND SHIPPING FORM.

The blank shown in Fig. 12 is the shop order form and is made out in triplicate by carbon sheets in the usual manner. These cards are 4x6 inches and one of the three sheets is of stout card stock while the other two forms are printed on paper. The latter is used by the workman and his foreman while the card is intended for preservation as a record of the work when all the operations on that particular order have been completed. It will be seen that the card is restricted to a single part of the machine, that the list number of the part and the shop order number which designates this lot of work, together with the dates, start to finish, the material and the number of pieces, are all clearly shown. On the other side of this card is the form seen in Fig. 13. This gives the list of finished material and every facility for locating responsibility for results.

Fig. 14 illustrates the requisition order form on the stock clerk. This form is 3x5 inches and its use is imperative throughout the works. It forms the receipt for stock and is easily filed as a record of the quantity and value of supplies furnished on order.

The workman's time slip covering the record of each machine shop operation is shown in Fig. 15. This card is also 3x5 inches and by a couple of strokes of the pencil it will be noted the workman can clearly state in shorthand style the character of his work and the exact time it has consumed. A line is drawn for that purpose through the spaces beneath the hours and fractions, while a dash through the circle opposite the word indicating the type of labor tells the rest of the story.

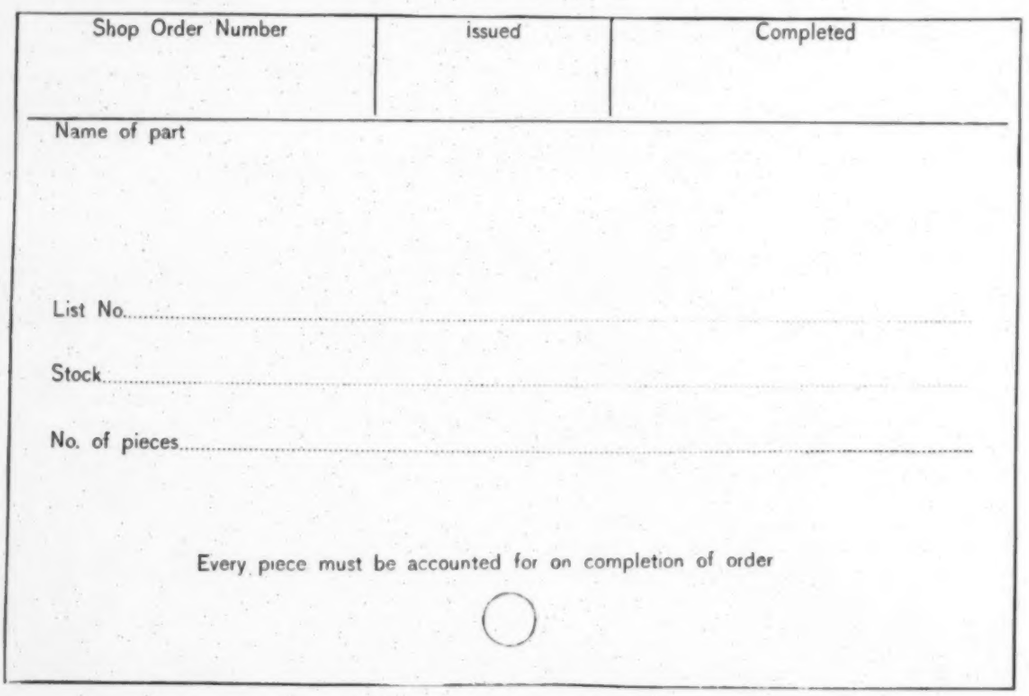


FIG. 12.—SHOP ORDER FORM.

A plain card is used in the office to keep track of the material or supplies considered by the purchasing department. These are indexed according to the name of the material in preference to that of the dealer or manufacturer. This avoids a great amount of cross references.

The office cost card is reproduced in Fig. 16 and is carried out in detail for each operation on any part of the machine.

Mr. Bennett cuts off the unessential accounting complications by a very simple system of obtaining the constant for the shop expense. He divides the productive from the non-productive element in the factory organization in the usual manner. Then he obtains the expense account in the aggregate from the ledger for the year and on taking the total number of hours spent in productive labor in the shop he can by a simple calculation in division arrive at the average hourly rate. By this method he can fill out the cost card showing the burden to be added to the amount of labor expended by the workman on finishing the quantity of parts on this particular order. The total shop cost being obtained on the lot, it is easy to give the cost of each piece for any operation and to this is added the non-productive expense. The card permits a close watch to be kept on the productive expense and seems to be sufficiently accurate and complete for all practical purposes. It shows concisely all that the management may reasonably expect to learn of manufacturing costs, with such a minimum of labor, and it carries in a neat, not to say elegant, manner a valuable contribution to the financial and productive history of the plant.

The isolation of the plant among the hills of Vermont has been no appreciable handicap to its progress and it has had an entire immunity from the strike microbe that elsewhere has proved so serious an obstacle to the development of a permanent business. Many of the workmen have grown up with the plant and have a long connection with its successful career and this stability of employment and special training extends from every department up and through the office. The visitor often in his inquiries meets with evidence of a lengthened service, from the secretary down along the rank and file of the employes. The superintendent graduated from the charge of the drafting room, for example, and other instances of growth and tenure of office might be cited. It is sufficient to say that a remarkably successful machine works need not be confined within the limits of our large cities and that there are compensating advantages for even a remote location in some cases. The Jones & Lamson Machine Co. has fully utilized all the benefits of such a position and does not seem to be hampered by any inconvenience in manufacturing or selling.

The product is sold direct to the purchaser, although times have changed since the earlier days. Then it was necessary to do considerable missionary work until the machine had gained some foothold; but the possibility of giving a local reference in many cases has rendered the need of a personal visit from an expert now not nearly so essential a detail in the making of a successful sale. The old plan is still the practice of the company and this constant and direct intercourse with the trade may in all probability have had a great deal to do with the concentration upon the one style of machine. Inability to manufacture beyond the demand for the one tool, and the manufacturing conveniences of limiting operations as opposed to the variable requirements of a more diversified product have had, however, the most potent influence upon the company's manufacturing and sales policy.

The writer has recently had the pleasure of meeting Mr. Russell, the representative in charge of the English office at Birmingham. In the course of the conversation Mr. Russell was understood to have a belief which was shared by many other business men abroad that a slow but steady growth in

Parts accounted for			
Date	Quantity	On Order No.	Spoiled or Received by

FIG. 13.—LIST OF FINISHED MATERIAL.

FIG. 14.—ORDER FORM FOR MATERIAL.

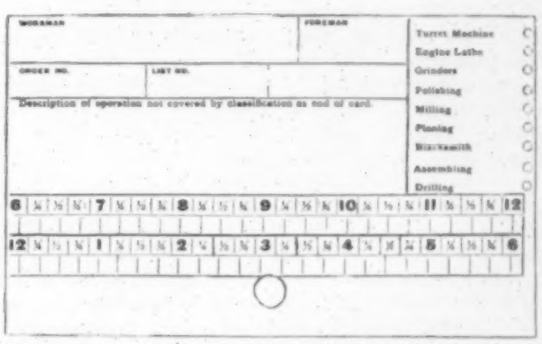


FIG. 15.—WORKMAN'S TIME SLIP, COVERING OPERATIONS, ETC.

the exports of American machine tools to the British Isles would be the immediate result of the peace negotiations lately concluded. He considered that there would be nothing in the way of a boom before the commencement of the new year but that then a very vigorous trade might be expected. He had found the manufacturers of textile machinery among the most progressive of English machinists but saw a general welcome to improved machines expressed by many business men there and thought that with the advent of peace decidedly better trade conditions would prevail. Mr. Russell, by the way, is a graduate of the shop at Springfield.

Republic Iron & Steel Co.

President A. W. Thompson, of the above company, is thus quoted: "We are as busy as can be, and no one can ask for more prosperity. The various rumors of our earnings for the first half of 1902 are mere guesses. Our half year ends June 30, and it will take us until July 25 to prepare and issue our half yearly statement. Our statement will be handsome, but it must be remembered that we have not had the benefit of our new furnaces and improvements until recently. Every mill we own is making money. The largest one we have is at Youngstown, where we have decided to put in a new and much larger reversing engine. Eastern engineers all say this is the finest billet mill in the country, and in fact all our plants have been maintained at a high standard and will compare with the plants of the United States Steel Corporation. The anthracite strike can have no effect on us, as we are not dependent for our supply of coal on this source."

The We-Fu-Go and Scaife water softening and purifying system are manufactured by Wm. B. Scaife & Sons Co., Pittsburg. The We-Fu-Go system is a cold intermittent system, and was formerly manufactured by the We-Fu-Go Co., of Cincinnati, O. This company has been absorbed by Wm. B. Scaife & Sons Co. The Scaife system is a hot continuous system. The following are some of the contracts recently closed by them: Hecla Portland Cement & Coal Co., North Bay Mich., 1,500-h. p.; Hecla Portland Cement & Coal Co., West Branch, Mich., 500-h. p.; Isaac Harter Co., Fostoria, O., 1,000-h. p.; A. A. Simonds & Son, Dayton, O., 200-h. p.; American Sheet Steel Co., New Philadelphia, O., 1,300-h. p.; National Mining Co., Pittsburg, 1,000-h. p.; Antrim Iron Co., Mancelona, Mich., 1,500-h. p.; Ashtabula Worsted Mills, Ashtabula, O., 96,000 gallons per day; W. D. Boyce Paper Mills Co., Marseilles, Ill., 1,250,000 gallons per day. These systems are built for any industrial purpose and for any capacity.

BRITISH AND GERMAN IRON PRODUCTION FOR 1901.

Mr. J. S. Jeans, the secretary of the British Iron Trade Association, reports the production of pig iron, Bessemer steel, and open-hearth steel in Great Britain in 1901 as follows: Pig iron, 7,761,830 gross tons, against 8,959,691 tons in 1900, a loss of 1,197,861 tons; Bessemer steel ingots, 1,606,253 tons, against 1,745,004 tons in 1900, a loss of 138,751 tons; open-hearth steel ingots, 3,297,791 tons, against 3,156,050 tons in 1900, a gain of 141,741 tons.

Dr. H. Rentzsch, the statistician of the Association of German Iron and Steel Manufacturers, reports the production of pig iron in Germany and Luxemburg in 1901 as amounting to 7,860,893 metric tons, against 8,520,541 tons in 1900, a loss of 659,648 tons. He also reports the production of steel ingots and castings in Germany and Luxemburg in 1901 as amounting to 6,394,222 metric tons, against 6,645,869 tons in 1900, a loss of 251,647 tons.

Adding the production of pig iron by Great Britain in 1901 to that of Germany and Luxemburg, and reducing metric tons to gross tons, gives us a total production of pig iron by both countries in 1901 of 15,498,493 gross tons, or 379,861 tons less than the production of 15,878,354 tons by the United States in the same year.

Assuming that the production of crucible steel in Great Britain in 1901 amounted to 95,956 gross tons, that country's total production of steel in that year would be exactly 5,000,000 tons, her total production of Bessemer and open-hearth steel being 4,904,044 tons. Adding Great Britain's estimated total production of steel in 1901 to the total steel production of Germany and Luxemburg in that year, after reducing the latter's production to gross tons, gives us for both countries a total production in 1901 of 11,293,170 gross tons, or 2,180,425 tons less than the production of 13,473,595 tons by the United States in the same year.

From the Mining Statistics Branch of His Majesty's Home Office we learn that the total production of coal in Great Britain in 1901 amounted to 219,046,945 gross tons, against 225,181,300 tons in 1900, a decrease of 6,134,355 tons. The production of iron ore in Great Britain in 1901 was 12,275,198 tons, against 14,028,208 tons in 1900, a decrease of 1,753,010 tons.—[Bulletin of the American Iron and Steel Association.

The corporation of Nottingham, England, intends to purchase over $500,000 worth of machinery in connection with its electric lighting system.

Order No.	List No.	Quantity	Date Started	Date Completed	Name of Part			
Material						Total Cost	Cost per piece	Cost per piece Constant at.....
Operation	Hours	Amount	Shop Expense Constant at.....					
Turret Mach.								
Engine Lathe								
Grinders								
Polishing								
Milling								
Planing								
Blacksmith								
Drilling								
Assembling								
Premium								
Other Work								

FIG. 16.—COST CARD USED IN OFFICE.

Electric Equipment in Modern Machine Shop Practice.*

BY F. B. DUNCAN.

As the steel and iron industries are the vitals of the manufacturing interests of the country anything which promises increased efficiency in our shops is worthy of the closest investigation, and of having the best engineering talent devoted to the solution of the questions involved. Of the many changes electrical machinery has introduced in manufacturing, a very important phase is the part it plays in the equipment of the modern machine shop. The traction field has been fairly well worked over. Standard lines of apparatus, both mechanical and electrical, have been evolved, and there is at the disposal of the capitalist entering this field a well defined system as to type of generators, motors, controllers, transmission lines, etc., and all that remains to be done by the engineer in charge of any particular installation is to have made the slight modifications necessary to suit local conditions.

Turning to the metal working industries (which are incomparably of more importance to the country, both from the amount of capital invested and from their relation to our national prosperity and supremacy) progressive manufacturers everywhere are installing electrical transmission in their plants, and yet most take up the question, especially in machine shops, only to find it is impossible to obtain anything like a complete shop equipment of tools with individual motor drive, and what can be obtained is a sort of half-breed compromise between a belted outfit and an electrically operated one; while in the smaller sizes of tools it is practically impossible to obtain anything pertaining to an electrically driven equipment.

There are some few isolated instances of tool manufacturers who have placed on the market a single machine which they have designed more or less with electrical operation in view, and there are a few others that have brought out an isolated tool design with electrical operation *alone* in consideration, with a success that would warrant very much more extensive endeavors along this line. There is a large and increasing demand for more tools of the smaller sizes to be designed exclusively for electrical operation. It is possible to obtain at present some sort of an aggregation of individual motor driven tools in the large sizes, while in small tools it is impossible to obtain a like outfit, owing to the impracticability of combining standard motors with the standard belt-driven small tools.

Most of the motor driven combinations, even in the larger machine tools, are fearful and wonderful productions, the very appearance of which disgraces the electrical and mechanical engineering professions as a whole, and not the unfortunate individual who is immediately responsible for the combination. Many a good mechanical engineer has lamented the fact that it was his painful duty to assist at the birth of such ungainly progeny, and many an able electrical engineer has expressed regret that good electrical apparatus should be subjected to adverse criticism through being operated under unfavorable conditions. The result is that neither machine tool builders, nor electrical manufacturers, nor the purchaser of the combination apparatus have been satisfied, and the fact that even with this handicap electrical individual drive is forging ahead is proof of its intrinsic merit.

Need of Agreement Between User and Builder.

Much of the difficulty attending the placing on the market of electrically driven tools is the lack of co-operation between the manufacturer and the tool builder. Neither has given due consideration to the problems confronting his associate, and, although the writer is connected with the electrical side of the question, he must admit that a great deal of the fault is on the side of the electrical fraternity, who have not given (nor do they yet) sufficient consideration to the peculiar problems confronting the mechnical engineer in the machine tool field. A tour of the leading machine tool manufacturers and a free discussion of their needs and the methods taken to meet them has resulted in making the writer acquainted with many cases where the motor manufacturers have stood greatly in the way of their own interest, a standing grievance of the machine tool trade being that when they took up the question of electrical equipment there was almost invariably sent to them an electrical representative who, while a good salesman, had not sufficient engineering knowledge to inteligently discuss means to meet the simplest obstacles that might arise, and in most cases it resulted in motors being bought entirely unsuited to the tool, with the result of great dissatisfaction among all concerned.

Many machine tool builders, on the other hand, wedded to the belt drive look upon electrical operation as a fad, refuse to make the simplest concession in the construction of their machines, and discourage customers in their intention to adopt it, and when compelled to furnish a motor driven machine they are rather glad than otherwise if it is unsatisfactory. One large manufacturer put it to the writer tersely as follows when discussing electric drive: "We discourage fads all we can." In general, however, most of the leading tool builders of the country are ready to enter into a thorough investigation of the questions pertaining to motor drive, and to co-operate in every way with the electrical manufacturer in the solution of its difficulties.

Great Speed Variations.

The one great difficulty from the electrical side of this question is that of obtaining necessary speed variation. It must be admitted that this is a serious obstacle, owing to the great variation required (a ratio of eight to one being necessary in many instances). There is, of course, much apparatus such as tapping machines, bolt cutters, pipe cutters and pipe threading machines, power shears, emery wheels, grindstones, buffing apparatus, foundry blowers, etc., that require very little variation in speed, not more than can be readily obtained by shunt field regulation. There are a number of serious difficulties on the mechanical side, but they are incidental rather than fundamental, and therefore by the expenditure of capital and engineering talent can be readily eliminated. Some of these are the following:

1. The present design of machines for belt operation necessitates new patterns for many parts before they can be electrically driven.
2. The greater first cost as yet of motor driven tools.
3. That the present design of many tools is not heavy enough to stand positive motor operation.
4. The large demand as yet for belt drive machines compared with that of electrically operated ones, and the reluctance of manufacturers to be the pioneers in what is as yet commercially an untrodden path.

It is not the writer's intention to go into the engineering or business details of this question, but simply to indicate methods that have been used, and can be used again on a broader scale to overcome these obstacles to what is an ideal method of power transmission.

Speed variation on the electrical side of the question is the most serious of all these problems, and must be given most serious consideration if anything is to be accomplished. There are a number of well known ways to obtain the desired variation of speed, some of them purely electrical, and others partly mechanical; to the latter class belongs the single voltage system with shunt field regulation. By this means there can be obtained electrically not more than 100 percent increase above the normal, the other changes must be accomplished by means of gearing or some other mechanical method, unless we consider in this connection the double commutator motor.

The single voltage system has one distinct advantage, which is, that a power plant can be installed of the same voltage as the local power service, and for overtime work it enables a manufacturer to dispense with the service of an engineer and fireman and the attendant losses from operating his generating machinery at night, or if power is furnished cheap enough to dispense with his own generating station entirely. It also permits a shut-down for repairs of boilers or other generating apparatus without disturbing the operation of the factory as a whole. Its disadvantages are the fact that if any great range of speed is to be obtained electrically, a double commutator must be used, the additional space required for this design in the tool construction and the multiplying of the care of the commutator and brushes. The multi-voltage system is a

*Read before the May meeting of the Engineers' Society of Western Pennsylvania. The writer is general superintendent of the Akron Electric Manufacturing Co., Akron, O.

method which furnishes the desired variation in speed by electrical means alone. This system in the sense of four or more voltages solves the question of speed variation, but introduces some serious disadvantages. Among them is the complicated generating set, switchboard, controllers, installation, and the larger first cost of same. Another is the inability of economically operating the plant from an outside source of power. There are other objections to this system which might be mentioned, but it is not the purpose of this article to enter closely into the question. There are some objections to each of these systems, and as the settling on standard practice for shop equipment is the first question to be determined before any real progress can be made, the consideration of this matter should be therefore seriously undertaken by our engineers, and a little of standard practice worked out.

The Compromise Three-Wire System.

A compromise between the two systems above mentioned, which would combine many of the advantages of both, is the common three-wire system of using field regulation between the steps and for an exceptional tool needing very wide speed variation, the use of a double commutator motor. For compact plants could be used the 110-220, and for more scattering or larger plants the 220-440 volts transmission. Lamps can, of course, be used at 110 or 220 volts as the case might require. Across the outside wires, planers, grinders, blowers, buffing machines, and wood shop apparatus, etc., would be connected, as in general they do not need any more variation than can be obtained by the shunt field. Lathes, boring mills, milling machines, drill presses, etc., would be operated from either voltage at will, and speed between steps of voltage be obtained by field regulation.

The present is an opportune time to take up this question of machine tool drive as the advent of the Taylor-White and other similarly treated steels with the attendant heavy duty and high speeds are necessitating a complete re-design of most of the machine tools now built, because they are not heavy enough to stand the strain resulting from the use of this steel, and the belts and pulleys of dimensions as now used simply will not transmit the power required. Motor drive by means of a motor geared to the tool furnishes the positive drive necessary to the practical use of these steels, and also (through the circuit breaker) provides an adjustable release which obviates the necessity of a "slipping point" in the tool itself such as is now provided in the belt driven machine tools, and which point is in many machines away below where it should be, in order to get the greatest efficiency from the tool.

Many of the difficult problems attending machine tool drive are being solved, one of the last and most important advances in this line being the entire elimination of belts and pulleys in planer operation. Direct connected motors and magnetic clutches being the solution of this difficult and what was for some time one of the most difficult has now become the easiest machine to operate electrically without belts or countershafts.

Advantages of Independent Motor System.

A brief setting forth of the advantages pertaining to individual motor operation of tools is given below:

1. Greater output per machine due to positive nature of drive; in many cases this is at least 50 percent.

2. Ability to accurately determine by means of recording instruments centrally located with a multi-point switch whether tools are being kept at work in proper manner, thereby affording a graphic record of the time each machine is in operation, and its consumption of power. This will also enable the detection of tools that are in bad condition due to abnormal friction of bearings or moving parts.

3. The flexibility of placement of machine tools to suit the passage of the work through the shop.

4. Better light and absence of dirt due to belts, shafting, pulley hangers, etc., and less first cost of building owing to the lighter overhead construction permissible when no shafting, pulleys, hangers, or belt tension have to be taken care of.

5. Free head room for crane service.

6. Ability to shut down or start up any one machine independently of all others.

It is the writer's opinion that the individual method of operation will obtain in smaller units until even the very smallest tools can be so obtained, and the crying need of the hour is an electro-mechanical tool concern that will devote its entire energies to this field and design and build a complete line of electrically driven apparatus with this method of operation alone in view. There is needed a complete line of drill-presses, lathes, milling machines, planers, boring machines, both horizontal and vertical that would enable progressive manufacturers to install a complete individual motor driven equipment, which, at the present time, is practically impossible. The market for this apparatus would at present consist of two classes of customers:

1. Those who desire a plant that will produce work in the most economical manner, and are willing to pay for it.

2. Those who wish to equip a small shop without going to the expense of installing boilers, engines or shafting.

The power consumption in a plant of this kind would be smaller than in a belt driven one, but that question after all is a minor one. The efficiency of the tool installation in reference to the amount of work turned out and the final cost of such work is the primary and great object to be kept in view. The prospect is so alluring that strenuous efforts should be made by electrical engineers to meet the conditions, as it is on their side that the fundamental difficulty lies, and there should always be kept in view that golden age condition of a unit power station operated for all the manufacturers of any locality and power furnished by it to all, thus abolishing the abominable system now in vogue of hundreds of small generating plants with their attendant lack of economy and unreliability.

This is an end worth looking forward to, but it will need much "strenuous life" on the part of both the business element and the engineering fraternity before is obtained the inestimable privilege of closing the switch at any time of night or day and having at disposal unlimited power with practically no possibility of a shut down in combination with the unrivaled efficiency in production of work of a motor driven tool.

Appended to this paper is a sheet giving motor power required by a number of the standard makes of tools in general use by machine shops of this country.

DATA SHEET OF MOTOR POWER ON STANDARD MACHINE TOOLS.

No. 1.

Description of machine, Planer.
Make of machine, Niles Tool Works Co.
Size of machine, 10 feet by 10 feet by 20 feet.
Number of cutting tools, 3.
Size of cut, ¾ inch by ⅛ inch each tool.
Cutting speed, 18 feet per minute.
Material machined, cast iron.
Weight on platen, 40 tons.
Power for cut, 26.54 h. p.
Power for reverse, 42.93 h. p.
Power for return, 23.56 h. p.
Ratio of return, 3 to 1.
Method of drive, Motor belted to counter shaft.
Kind of motor, d. c. compound wound.
Remarks:—Not enough flywheel effect on countershaft to equalize load at moment of reversal. A 30-h. p. motor was used for above drive with good results.

No. 2.

Description of machine, Planer.
Make of machine, Pond Machine Co.
Size of machine, 8 feet by 8 feet by 20 feet.
Number of cutting tools, 3.
Size of cut, 5/16 inch by ⅛ inch each tool.
Cutting speed, 18 feet per minute.
Material machined, cast iron.
Weight on platen, 32 tons.
Power for cut, 16 h. p.
Power for reverse, 28.15 h. p.
Power for return, 14.80 h. p.
Ratio of return, 3 to 1.
Method of drive, Motor belted to countershaft.
Kind of motor, d. c. compound wound.
Remarks:—Not enough flywheel effected on countershaft to equalize load at moment of reversal. A 25-h. p. motor was used on this machine with good results.

No. 3.

Description of machine, Planer.
Make of machine, Pond Machine Co.
Size of machine, 66 feet by 60 feet by 12 feet.
Number of cutting tools, 2.
Size of cut, ½ inch by 1-16 inch.
Cutting speed, 21 feet per minute.

Material machined, open-hearth steel castings.
Weight on platen, 4 tons.
Power for cut, 10 h. p.
Power for reverse, 16 h. p.
Power for return, 14 h. p.
Ratio of return, 3½ to 1.

Method of drive, direct current compound wound motor, mounted on housing of planer with 42-inch, 1,500-pound flywheel running at 400 r. p. m., mounted on motor shaft. Flywheel used as driving pulley for return of platen.

Remarks:—A series of recording ammeter cards taken on this planer showed it was idle an average of 2½ hours per day, showing a saving of power by use of individual motor drive. The above 2½ hours was generally made up of short periods for setting work, taking measurements, etc.

No. 4.

Description of machine, Planer.
Make of machine, Gray.
Size of machine, 28 inches by 32 inches by 6 feet.
Number of cutting tools, 1.
Size of cut, ¾ inch by ⅛ inch.
Cutting speed, 22 feet per minute.
Material machined, cast iron.
Weight on platen, 3 tons.
Power for cut, 3.1 h. p.
Power for reverse, 4.4 h. p.
Power for return, 3.8 h. p.
Ratio of return, 4 to 1.

Method of drive, d. c. compound wound motor mounted on platen housings with flywheel 30 inches diameter, 496 pounds, 800 r. p. m., mounted on motor shaft and used as pulley for return of platen.

Remarks:—Average load on motor 2.48. A 3-h. p. motor at 800 r. p. m. gave first rate service. Rheostat used in series with shunt field to raise cutting speed on light work to 30" per minute.

No. 5.

Description of machine, Turret lathe.
Make of machine, Gisholt Machine Co.
Size of machine, 28 inch swing.
Number of cutting tools, 5.
Size of cut, ¾ inch by 5-16 inch, 1 tool. ½ inch by 5-64 inch, 4 tool.
Cutting speed, 25 feet.
Material machined, Tropenas cast steel.
Power for cut, 3.9 h. p.
Weight of casting, 400 pounds.

Method of drive, d. c. compound wound motor, 600 r. p. m., geared to headstock gear in place of cone pulley. Speed variations on motor 100 percent in all, 25 percent by armature control below normal and 75 percent increase above normal by resistance in shunt field. Eleven points in controller giving with the three gear speeds, 33 changes of speed in all. An increase in output of 100 percent was obtained on this machine by changing from belt to geared motor drive.

No. 6.

Description of machine, Drill press.
Make of machine, W. F. & John Barnes.
Size of machine, 21 inches.
Motor power required, 1 h. p.

Method of drive, d. c. compound motor mounted on frame of press and belted down to driving pulley. Starter and reversing switch mounted on frame of press within reach of operator seated at table.

No. 7.

Description of machine, Radial drill press.
Mike of machine, Niles Tool Works Co.
Size of machine, No. 1, 5-foot arm from center of column.
Motor power required (max.), 2.03 h. p.
Size of motor used, 2 h. p., 600 r. p. m.
Method of drive, vertical d. c. compound wound motor mounted on top of column and geared to driving shaft. Rawhide pinion used on motor shaft.

No. 8.

Description of machine, Double end emery wheel stand.
Size of wheel, 18 inches by 2 inches, wheels.
Speed of wheels, 950 r. p. m.
Kind of work, 2 laborers grinding castings.
Maximum h. p., 6 h. p. momentarily.
Average h. p., 3.5 h. p.

H. P. motor required, 5 h. p. open with dust proof covers.

Method of drive, d. c compound wound motor mounted on grinder shaft between the wheels.

No. 9.

Description of machine, Vertical boring mill.
Make of machine, Pond Machine Co.
Size of machine, 10-foot table.
Number of cutting tools, 2.
Size of cut, ¾ inch by 1-16 inch.
Cutting speed, 20 feet per minute.
Material machined, cast iron.
Weight on table, 3.5 tons.
Motor power required, 8.58 h. p.

Method of drive, d. c. compound wound motor belted to countershaft. Twelve h. p. motor gave good results on heaviest cuts and weights of castings.

No. 10.

Description of machine, Slotter.
Make of machine, Bement-Miles.
Number of cutting tools, 1.
Size of cut, ⅜ inch by 1-16 inch.
Speed of tool, 20 feet per minute.
Material machined, open-hearth steel castings.
Motor power required, 6.98 h. p.
Method of drive, d. c. compound wound motor belted to countershaft.

No. 11.

Description of machine, flat turret Lathe.
Make of machine, Jones & Lamson.
Size of machine, 2 inches by 24 inches, their standard.
Motor power required, 1½ h. p. for satisfactory service.

No. 12.

Description of machine, Tool grinder.
Make of machine, Gisholt Machine Co.
Size of wheel, their stand cup wheel.
Speed of wheel, 16 to 18 r. p. m.
Maximum h. p. required, 7 for short periods.
Average h. p. required, 4.

Method of drive, d. c. compound wound enclosed motor mounted on grinder shaft with field rheostat in series with shunt coils to increase speed from 1,600 to 1,800. A 5-h. p. open motor with enclosing covers gave good satisfaction on this grinder.

No. 13.

Description of machine, Engine lathe.
Make of machine, Hendey-Norton.
Size of machine, 16 inches.
Motor power required, approximate, 2 h. p. at maximum.
Method of drive, d. c. compound wound motor mounted on support, bolted to bed of lathe and equipped with clutch and cone pulley with belt to headstock cone.

No. 14.

Description of machine, Engine lathe.
Make of machine, Putnam.
Size of machine, 18 inches by 6 feet, between centers.
Motor power required, 2.1 h. p.
Method of drive, d. c. compound wound motor geared to countershaft.

No. 15.

Description of machine, Engine lathe.
Make of machine, Pond Machine Co.
Size of tool, 36 inches by 10 feet, between centers.
Motor power required, 10 h. p.
Method of drive, d. c. compound wound motor direct geared to countershaft.

On all the above machines where motors are geared, rawhide pinions were used on motor shaft. Information as to motor horsepower required for tools not given above will be cheerfully furnished to those interested, as it is the writer's belief that the more generally such information is disseminated the sooner machine tool builders, motor manufacturers and machine shop proprietors will be able to solve the questions pertaining to the economical production of the machinery merchandise of the country.

Discussion by H. W. Fisher.—We are using electric motors in a few of our factories at the present time. At Perth Amboy, we use alternating current motors—three-phase—and use them with a great deal of satisfaction. I think the only trouble which developed was a hot box which had to be rebabbitted. In our Pittsburg factory we have used special direct current motors. The only objection I see to the direct current motor is the trouble with the commutator. Occasionally it sparks too much, and the commutator has to be turned down, which, of course, takes a little time to do. But in general these

motors have run a good many months without having anything done to them. I think, however, that one or two suggestions might be made to the manufacturers of motors and generators which would be of benefit to those who use them. I know of a case where a motor was set up according to directions ready to be operated, but the outfit had resistance in series with the armature. The motor, of course, sparked a very great deal and the resistance got very hot. Several positions of the brushes were tried but in every case the resistance heated. Then one of the engineers of the Westinghouse Co. was sent for and he very soon got the motor to running all right. It appeared that the brushes were not set right. A very little difference in the set of the brushes made quite a difference in the operation of the motor on account of the excessive amount of current going through it. It seems to me that when these motors are sent out a diagram or drawing should accompany them showing the approximate position of the brushes, so that the comparatively ignorant person who has to set up the motor can probably get it right the first time.

The regular monthly meeting of the Engineers' Society of Western Pennsylvania was held at the rooms of the Society, 410 Penn Ave., Pittsburg, on Tuesday evening, June 17. The papers read dealt with the erection of the Union Station of the Pennsylvania Railroad and were highly interesting from an architectural and engineering standpoint. The following were elected to membership in the society: Marshall W. Brown, superintendent Arthur McMullen & Co., of New York; William G. Doolittle, patent attorney; Louis H. Flanders, Westinghouse Machine Co.; Edward H. Goodman, vice president Union Switch & Signal Co.; Leslie J. Gray, American Steel & Wire Co.; Edmund J. Mould, George A. Hogg Foundry Co.; Robert A. McKee, Westinghouse Machine Co.; Brabazon Rutherford, Allegheny County Light Co.; Edward H. Spooner, city electrician, Allegheny; Oswald E. Winger, American Steel & Wire Co.; Louis J. Affelden, American Bridge Co.; John M. Davidson, American Sheet Steel Co.; Victor E. Edwards, Morgan Construction Co.; William J. Harris, Harris & Sons Forging Co.; Frank C. Irvine, Cleveland & Marietta railway; Hugh D. Kimber, engineer; Charles R. Miller, Carnegie Steel Co.; Lee C. Morganrath, Harbison-Walker Co.; Almos D. Noeld, civil engineer; Calvin W. Rice, vice president Nernst Lamp Co.; Charles G. Smith, Charles G. Smith Co.

The Semi-Centennial of the Sault Ste. Marie Canal, dating from the breaking of ground for construction, will occur on June 4, 1903. A movement is now on foot to celebrate this occasion, and a memorial has been sent to congress to this end asking for $50,000. This memorial states that at that canal can be witnessed the greatest concentration of commercial tonnage traffic on the globe. During 1901 over 28,000,000 tons of paying freight, valued at nearly $300,000,000, passed through this 200-feet wide channel. This is a greater volume of freight than passed between Europe and America in the same time; and the Suez Canal tonnage for 1901 was less than one-third of that of the Sault Canal. Fifty years ago a dozen horses, operating a flat-rail tramway and plank road, moved all the freight then passing to or from Lake Superior.

The new plant of the Jackson Iron & Tin Plate Co., Clarksburg, W. Va., has been placed in operation and will be on in full within a few weeks. The main building is of steel construction, 110x366 feet. The assorting and storage house is 80x80, pickling house 36x80, and the boiler house 60x120 feet. The main building contains 8 tin mills and 6 heating furnaces. When the mills are on in full the daily output will amount to about 70 tons. About 400 men will be employed when the plant is completed.

Capt. W. B. Rodgers has resigned as sales agent and a member of the board of directors of the Monongahela Coal & Coke Co., Pittsburg, Pa. J. Herman Rodgers, also connected with the sales department has also resigned. William D. O'Neil has been placed in charge of the sales department to succeed Capt. Rodgers.

CONTRACTS TO STAY OUT OF BUSINESS INVALID.

A suit of much importance was decided by Judge A. C. Thompson in the United States Circuit Court at Columbus, O., last week. The decision was made in the suit brought by the S. Jarvis Adams Co., of Pittsburg, against Sanford A. Knapp and J. M. Bossert as individuals and the Coshocton Iron Co., of Coshocton, O., a corporation.

The suit was brought by the Pittsburg company against the defendants to enjoin them from manufacturing or selling bell dies or tong dies or axle balls similar to those made by the Pittsburg corporation. The Adams company, prior to 1901, had in its employ Knapp and Bossert. Before 1900 Mr. Adams was the owner of the business. In that year the corporation was formed. Bossert and Knapp were given salaries of $2,500 per year and $25,000 in capital stock, to be paid for out of the earnings. In 1901 they resigned, but the company declined to pay the earnings on the stock unless they signed a contract not to engage in a similar business in this country. The contract was signed, the money paid over and shortly afterward the Coshocton company was formed to manufacture the same class of products as the Adams company. The Adams company brought suit to enjoin the defendants. The petition was demurred to, the defense being that the contract was against public policy and entered into for the purpose of stifling competition.

Judge Thompson held that this was true. The demurrer was sustained and the petition dismissed. The Court said it was admitted that the plaintiff controls 75 percent of the business in the United States, and by stifling competition and buying out manufacturers would soon have a monopoly. The naked contract showed that it had been entered into to restrain competition and there was no counterbalancing claim. Such a contract for such a scheme was plainly unlawful, the Court said. The plaintiff had not given anything or secured anything that should be protected. Judge Thompson said the money paid to the defendants was not paid justly, and the plaintiff had the right to sue to recover it. The defendants, however, could not be molested in their business nor restrained from manufacturing anything they saw fit.

London *Engineering* announces that the Association des Industriels de France, of 3, Rue de Lutée, Paris, has organized a competitive trial of devices for mounting belts on fast pulleys, which shall not require the workman to come near the revolving pulley and its shaft, a proximity which often leads to serious accidents. The trial is open to engineers of all nationalities, and competitors should send in detailed descriptions of their products, accompanied, if possible, by a model, to the president of the association, at the address given above, the latest date for the receipt of these being Oct. 1, 1902. After examining the description and drawings, a committee of the association will select a certain number for practical trial, and will award a prize of 1,000 francs to the device which in these trials proves itself the best. Full particulars can be obtained from the Directeur of the Association, 3, Rue de Lutée, Paris.

The condition of the American Locomotive Co.'s order books is significant of the sustained consumption of iron and steel on railroad account. Orders are now being booked for the delivery of locomotives in the spring of 1904 and nothing can be taken that calls for delivery earlier than the second half of 1903. Officers of the company say that it has been impossible for railroads to get all the locomotives that could be profitably employed and this promises to be the case for another year. The orders now on the books do not represent great purchases by a few railroads, but more the aggregate of orders, proportioned somewhat to the size of systems, but coming from all parts of the country.

Owing to the remodeling of the Sylvan mill of the Republic Iron & Steel Co., at Moline, Ill., a special scale was arranged with the Amalgamated Association to govern its operation. No date has yet been fixed for holding another conference with the American Steel Hoop Co. for the adjustment of the three turn notes provided for in the scale agreement reached with the Republic Iron & Steel Co.

ADAMS EXPRESS COMPANY'S STEAM WAGON.

During the past four years the Adams Express Co. has carefully weighed the possibilities in the growth of the motor vehicle industry and has conducted a series of extensive experiments along this line. While the company has not introduced these machines into general service for the transportation of its own freight, sufficient progress has been made to certify abundantly to the fact that it has done something more than mark time. A recent opportunity was afforded the writer of obtaining at first hand full information in regard to the advance so far made. The experiments have been directed toward the production of a suitable steam propelled machine of such a degree of strength and simplicity that the ordinary teamster could readily learn to operate it with ease and certainty as well as continue the handling of the outfit for corresponding periods to those undertaken by the horse-drawn conveyance. On the same principle that a horse ought not to need the attendance of a veterinary surgeon on every trip, so it was held that the motive power should require no greater skill on a heavy team when operated by steam. In each case, of course, emergencies might require unusual treatment and in these instances the precautionary measures adopted in the first place should have postponed any but an extraordinary mishap.

Following this route the Adams Express Co. since the commencement of experiments looking to the production of a standard vehicle has worked out a practical design which has been subjected to two years' actual use. This 2-ton wagon is shown in the illustration and is capable of traveling at a 10-mile-an-hour rate. The wheels are placed in a vertical position and are 4 feet in diameter for the front wheel and 4 feet 6 inches for the rear, the company being thoroughly convinced of the advantages of large wheels. There is a patented arrangement by which great elasticity is given to the structure and which allows the suppression of the perch or underframe, consisting of a front axle guide of angle iron. The axle slides between these angle irons. The springs are also guided therein but these are loosely mounted on the axle top supporting the body, thus allowing the superstructure to be independent of the position in which either wheel may be placed on account of the irregularities in the road.

The work of designing and building these machines has been in charge of Arthur Herschmann, the mechanical engineer of the Adams Express Co., and in a recent interview he kindly outlined the conclusions resulting from these experiments. He preferred that his statements, while so much experimenting was in progress, should not be held as in any way unalterable but that further investigation in the light of rough every day service might modify if it did not indeed radically change his opinions.

THE ADAMS EXPRESS CO.'S STEAM WAGON.

"Our present wagon has been described so freely that I think you will prefer to have a few particulars about a heavier model which I have just redesigned and brought up to date. This machine is of the same general design as the one recently illustrated and essentially covered by the same patents. The limit of its carrying capacity is 5 tons and therefore it could only be used in exceptional cases in the service of this company. Considerable interest has been manifested by outside parties in this type of wagon. The leading manufacturers in this country have applied to the Adams Express Co. with the view of giving this machine a test.

"We have made a new venture in several respects in the disposition of the machinery in this 5-ton wagon. We have

located the boiler behind the front axle and shall seat the operator ahead of the generator. In our old design the boiler was in front of the operator and the position enabled the attendant to have access to the lower part of the generator. We find that the boiler can be placed behind the front axle and yet be readily accessible from the side of the machine. The space taken up by the machinery is remarkably small, though ample for convenient operation. The driver's view ahead is of course unobstructed as he sits close to the front of the vehicle and this arrangement also enables the steering wheels to come well in front, the latter feature accounting for the good manoeuvering qualities of the machine.

"The steering is effected by means of a hand wheel, placed in a vertical plane, and a chain and gear. The main feature in the design is the effort to produce an easy and yielding steering gear. A cast iron gear which can be readily replaced when broken, acts as a safeguard in case of a front wheel collision.

"There remains little doubt that public opinion is most prejudiced by the appearance of smokestacks on a wagon and the Adams Express Co., being well aware of this fact, endeavor to overcome the difficulty. Perhaps the most interesting feature of this wagon is the regulation of steam and the abolition of smokestacks. This heavy wagon has a cast iron hood over the boiler from which a smoke flue returns to the ground. The furnace and the ash chamber are entirely enclosed. An automatic air-pump is employed to blow air into the furnace. This air-pump is of a very simple design and readily accessible. It is yet too early to give further details about this device but I may say that it presents some interesting features.

"The boiler has a heating surface of 100 square feet and is designed for a pressure of 250 pounds per square inch. The possibility of an explosion can be scarcely said to exist even though the generator is of the shell type, as it contains ample provision for ready cleaning, a reliable supply of fuel and three independent safety devices. No difficulty is experienced with the regulation of steam or fire; a shaking grate being used which can also dump into the ash-box, the latter being normally all enclosed. I have found that one of these boilers equipped with the latest improvements will steam in about 25 minutes and that it will hold the pressure within a few pounds. A stop valve and a throttle valve are used in controlling; a superheating coil being inserted between the two.

"The engine has been designed to develop 25 horsepower at a normal speed of 400 revolutions per minute. It is of the compound type with a converting valve so that both cylinders can be made single acting. The engine is all enclosed, splash lubricated, and can be detached and replaced within a couple of hours. Heretofore the Adams Express Co. has used engines purchased in the market but found them illsuited for the purpose, and was compelled to design a special motor. Later experiments have convinced us that a small flywheel is of great benefit in securing steady running and it is now applied. The running gear of the Adams Express Co.'s design is too well known to need further explanation. The characteristic feature consists in the engaging of the springs to ease the machinery when starting and stopping the wagon.

"We have recently patented the locking of the compensating gear. This is an important improvement which will prevent skidding due to compensating features and which can also be used as an emergency brake on the hind wheels.

"The wagon has a clear loading space of 12 feet by 4 feet 7 inches. The height of the platform is 4 feet 4 inches with a slight slant downward towards the rear of the wagon. Track is 5 feet 6 inches. The vehicle is designed to take the full load up the steepest hill which it is liable to encounter and has two speeds, three and seven miles respectively."

It will be evident that the different details have received thorough consideration by Mr. Herschmann and his company and that careful discrimination is being exercised in order to produce the most satisfactory results. The engineer in charge decided long ago to pin his faith to steam as a motive power and later developments have not changed this belief. In reply to a query in regard to the progress made by other manufacturers of heavy steam vehicles abroad, Mr. Herschmann did not think these were well adapted to conditions on this side of the Atlantic and held that the successful machine would necessarily be produced by an engineer thoroughly familiar with American conditions and requirements. His experience had led him to adopt original methods after an investigation of the progress made by European inventors and from present indications and the broad spirit in which the subject has been handled hitherto there is every expectation that the Adams Express Co. will produce a machine of merit. Certainly there will be no extravagant or premature claims made for it and the needs of the company alone will enable a complete test as well as a realization of the exact nature of the work to be performed under working conditions. The opinion of the mechanical engineer at this time, whilst given with due caution, will be found of considerable interest and value as indicative of the trend of practical engineering in this field of transportation.

SHOPS USING THE PREMIUM WAGE SYSTEM.

It has given us a great deal of pleasure to comment favorably from time to time upon the very ingenious and successful method of remunerating labor devised by Mr. F. A. Halsey. Some time ago we had an opportunity of presenting an abstract of that gentleman's lecture at Cornell University on this subject, and today we are indebted to him for a list of firms using the premium plan. Occasionally we receive an inquiry in regard to the system and in the reply it is often advantageous to give the name of the nearest firm using it. The list submitted is fairly complete but we shall be glad to receive and publish any additional names of which our readers have knowledge:

Struthers, Wells & Co., Warren, Pa.
Westinghouse Electric & Mfg. Co., Pittsburg, Pa.
Pleuger & Henger Hardware Mfg. Co., St. Louis, Mo.
F. H. Leland, 1368 Belt Ave., St. Louis, Mo.
St. Peters & Grey Friars Works, Ipswich, Eng.
Chambers Bros. Co., 52nd St., below Lancaster Ave., Philadelphia, Pa.
Walter S. Ball, care United Shoe Machinery Co., Winchester, Mass.
Chambersburg Engineering Co., Chambersburg, Pa.
D'Amour & Littledale Machine Co., 129 Worth St., N. Y.
E. C. Atkins & Co., Indianapolis, Ind.
H. Bollinckx, Brussels, Belgium.
A. L. Ide & Sons, Springfield, Ill.
Newark Machine Tool Co., Newark, N. J.
Newton Machine Tool Works, Philadelphia, Pa.
Builders' Iron Foundry, Providence, R. I.
Providence Engineering Co., Providence, R. I.
Brioschi Finzi & Co., Milan, Italy.
Canadian Rand Drill Co., Sherbrooke, Canada.
Cathcart Foundry, Glasgow, Scotland.
Deere & Mansur Co., Moline, Ill.
Bullock Electric Mfg. Co., Cincinnati, O.
Pearson Machine Co., 31-45 Randolph St., Chicago, Ill.
Farnham Works, Leicester, Eng.
Christensen Engineering Co., Milwaukee, Wis.
Trimont Mfg. Co., Armory Ave., Roxbury, Mass.
American Tool Works Co., Cincinnati, O.
Bickford Drill & Tool Co., Cincinnati, O.
Cincinnati Milling Machine Co., Cincinnati, O.
Cincinnati Planer Co., Cincinnati, O.
Cincinnati Shaper Co., Cincinnati, O.
Lodge & Shipley Machine Tool Co., Cincinnati, O.
Miller, Du Brul & Peters Mfg. Co., Cincinnati, O.
Rahn, Meyer & Carpenter, Cincinnati, O.
Schumacher & Boye, Cincinnati, O.
Steptoe & Co., Cincinnati, O.
The Triumph Electric Co., Cincinnati, O.
The Chicago Pneumatic Tool Co., at the Aurora, Ill., plant.
Stilwell-Bierce & Smith-Vaile Co., Dayton, O.

The Thomas Iron Co., Easton, Pa., now has only three of its ten furnaces in operation, in view of the scarcity of fuel. Unless the strike in the anthracite region is soon called off it is believed that the remaining three will be compelled to bank.

SUGGESTED AT THE SHOP.

BY F. O. REMAN.

I have had something to say occasionally about the Patent Office and I am not yet through with the subject. The pages of the Patent Office Gazette are crowded with a number of ideas that ought not to be overlooked by the busy public; but the B. P. does not lose any sleep on that account. Maybe the ideas are crude enough from the standpoint of the commercial and perfected successes. But give the inventor a show, anyhow. He is with us for keeps and he contributes a goodly share of cash to the rushing expenses of the Government. His ideas may not get much attention, but a few of them do something to attract notice, and then these waifs of the wilderness are rudely awakened from their slumbers in the archives and given a show. Capital is naturally timid but impatient, and jerks the inventor roughly to the scratch, and a run for the money is a prime necessity. Here's where some inventors slip a cog. The fun only begins when licking the scheme into shape for the market. The idea may be ingenious and simple, but what if it finds that the public has no use for the thing? Making a market may need a whole lot of inventions. Many men with any amount of money have fallen down, and very hard at that, on the process of persuading an obstinate people to buy something it did not want. Educating the people is all right as a phrase but there are hosts of kinks in it as a money making proposition.

* * * * *

The Patent Office approval is only an incident in the progress of an invention. A valuable asset, of course, but not the only thing essential. Lots more patents may be needed to fill in details and perfect the process. The man who invented the Nernst lamp a very few years ago has only about half a dozen patents on it, but there are nearer a hundred already allowed and on the way through the office at Washington. These are to make the idea sound and practicable. Improvements in manufacturing processes, either in mechanism or material; protection to the general scheme so that some skilful mechanic cannot obtain like results by different means or methods in any way—these are the things that surround the successful inventor who has not only produced a good thing but has got it recognized and on its way to fill the long felt want that every patentee feels sure exists for the realization of his dreams.

* * * * *

What about the other fellow? The unsuccessful inventor does not have this worry. Not much. He too has had the pleasure of developing his invention through night and day dreams. He too has seen it grow from a thought into actual form and the dignity of the draftsman's art. The patent attorney has devoured it and the client and lawyer have fought gallantly through the forlorn hope of "anticipations" and "references" both before and after application. The wordy warfare has been continued over the mail and at last, after long and strenuous labor, the applicant gets the neatly engraved document that calls upon all concerned to note carefully that the aforesaid is the patentee. It is then further understood that the aforesaid patentee, his heirs and assigns, shall have the right to defend said patent at his or their own expense in any court whatsoever throughout the United States against any person or persons who may impugn these privileges. Now if the patent stops at that stage the inventor may be in luck or otherwise. He has had the pleasure of contributing something to the state of the art that may worry some other inventor and perplex the legal fraternity from bar to bench. The inventor may not hold this to be unalloyed joy and he can go further and fare worse. Let us hope that he meets appreciation and joins the ranks of those whom I consider successful inventors—the class who get hold of cash and ability to develop the patent to the limit; to that point at least where the public can be brought to feel that the new thing is a desirable one and the patentee gets a good slice of the appreciation in legal tender.

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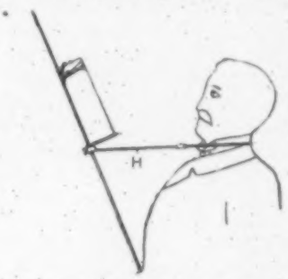
The milk of human kindness has not been so well watered in my case that I cannot hold out to some of these persistent patentees my word of commendation. If I can help them to the friendly boost of capital by any notice that the editor will let me slip into this department I would gladly do it. I am going to try it anyway in the case of an appliance, not to say a machine, which appears in the Patent Office *Gazette* for June 10. It is simple and fills the bill, if there is any need for it. I submit the technical description, accepted by the Patent Office authorities, as far as this is contained in three of the claims, which are as follows:

"A wire book-support having a transverse base, parallel standards rising therefrom, an adjustable clamp on said standards, a weighted cord for holding the book open, in combination with a neck-cord adjustable for length and a prop adjustable for length, substantially as specified. A book-support consisting of the transverse base, the standards rising therefrom, the adjustable book-ledge on said standards, the adjustable slide upon said standards having laterally downwardly-extending blades for holding the book open, and the weighted cord for holding the book open, substantially as specified. A book support and holder, having the transverse base, a standard rising therefrom, a longitudinally-adjustable book-ledge upon said standard, a cord adapted to engage the person of the reader and adjustable for length for holding the support in proper position for reading, and a weighted cord carried by the book-ledge for holding the book open, substantially as specified."



A RECENTLY PATENTED INVENTION.

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Lest the above may not be clear enough, I may say that the device is intended to support a book so that the bald-headed man in the illustration may read it. He looks surprised but there is not much fear that the book and the "longitudinally-adjustable book-ledge" will go over and smite him on the jaw unless he leans too far back. In that case the "transverse base" may slip its moorings and there might be a reader the less, provided the book is heavy enough. A heavy book, a tilting chair and a "longitudinally-adjustable" noose would be a suitable and highly effective equipment for a lynching party.

* * * * *

The device is not to be confined to the needs of those who for any cause whatever have lost their hands. By no means. The artist may have given that impression, but it is erroneous. Let me not limit the patentee in any way whatever. The reader seen in the engraving may be without his arms "substantially as described" but what of that? The artist has probably in the attempt to cover all possibilities of the case, assumed an unusual need and depicted the armless reader contemplating the decisive course of swallowing the slack of the "neck-cord" as far as the point H and then turning the pages with his nose.

In a paper read before the New York Chemists' Club, D. Woodman stated that he has found that defective welds can be detected by chemical means. A number of boiler tubes, he said, had given very bad results, corroding rapidly, though another similar set had resisted well. Analysis detected nothing wrong with the quality of the material, which was practically identical in both cases. It was then suggested that possibly differences in the welding might have something to do with the behavior of the tubes. This was tested by laying sections of each tube in a 10 percent solution of sulphuric acid. The good tubes were attacked uniformly all round, the line of the weld showing merely by its color. The other tubes, however, were eaten away very rapidly in the line of the weld, a deep slit being formed there, indicating that the metal was porous and open.

SAFEGUARDING MACHINERY IN THE SHOP.

Julius Moersch, a contributor to the *Journal of Political Economy*, submits some comments upon the safeguarding of factory machinery, a matter which is always timely and of great importance. We may venture to suggest in reference to the criticism of the writer upon the gasoline engine condemned in the article that the extension of the crank shaft beyond the hub of the flywheel is frequently seen on this type of engine and often serves a very useful purpose in holding a coupling or a pulley, etc. These small engines are made in quantities with no special reference to the particular place they may finally occupy. It is equally immaterial to the designer whether they furnish power for the chopping of fodder or operate a printing press, and the keyway is a useful possession. Some engine builders protect the end of the shaft by a brass cap retained in position by a small round head setscrew held in the center hole of the crank shaft. The J. H. Williams Co., manufacturer of drop forgings, pays particular attention to safeguarding machinery in its plant and protects gears, etc., by a substantial net work made of heavy wire. It is worth while to point out that the many improvements made in recent years have had a direct effect in safeguarding machinery. Every added convenience of crane or other service has cut down the liability to injury and the removal of the necessity for sheer brute force has in itself been a potent protection in many instances. The article referred to above is as follows:

"All civilized nations have enacted laws for the safety of working people who are employed around machinery, and every State in the union has some specific laws which refer to guarding of machinery. The beneficial effects of such legislation can best be observed in the efforts of mechanical engineers to devise means by which all points of danger to an operator of a machine may, as far as possible, be guarded, and the modern manufacturer, in this country at least, has shown great skill and ingenuity in solving this problem. He has been so successful that it is safe to say, safety guards, aside from being useful, today, are also an ornament to machinery.

"Let us look at some modern laundry machinery. There we find that all gears and cogwheels are effectively shielded. The big steam mangle with its three pairs of large rollers has a roller guard in front of the feed roller, which makes it absolutely impossible for the operator's fingers to be caught between the heated rollers, and the top of the mangle is protected by an iron screen. This screen is there for the sole purpose to prevent the operator from reaching over the rollers if she should want to rescue a sheet which has been going the wrong way, or to straighten out a piece of fabric which got doubled up. The extractor has been provided with a foot brake, and the outside bowl is covered by a wire hood, and it is impossible to reach down into the revolving inner bowl as long as the same is in motion. The pressman in a modern printing establishment may work with a feeling of perfect safety around his press, for all gearings have been guarded by ornamental shields. Woodworking machinery, which is operated at high speed, has also received due attention. The old-fashioned wooden tables of jointers, shapers, and saws have been replaced by solid and smooth iron tables and their different mechanical devices for the purpose of guiding the operator in his work are safe and easy to handle. A great source of danger by the operation of circular saws has been eliminated or reduced by the adjustment of a steel splitter to the saw table, behind the saw. This splitter prevents the wood which is to be worked upon from binding on the saw; for if a piece of wood closes in on the saw it will be hurled back with great force, and numerous are the fatal accidents which in this way have occurred. Passenger and freight elevators have been provided with self-acting safety devices, which hold the cab securely to the sliding guides in case of a break of the cable, and the former chains and handbars on freight elevator landings have been giving way to automatic raising and lowering gates. Statistical researches ascribe fully 50 percent of all accidents to workmen on machinery, to exposed collar setscrews and unsafe shaft couplings, but the old-fashioned collar with its protruding, square-headed setscrews, and the shaft coupling with exposed bolt heads and ends, an eyesore to a mechanic, have been replaced by safety collars and couplings, and an up-to-date manufacturer of machinery would just as little think of turning out shaft collars and couplings of the old type as a Sunday school teacher would of adopting the *Police Gazette* as a text-book for religion. It may be said that modern constructors of machinery have not spared energy and thought to make machinery as safe as possible without interfering with their utility, and they have done much toward reducing the chances for accidents to persons that have to work on such machinery. Today there is hardly any excuse for an accident caused by exposed collar setscrews or shaft couplings with projecting bolts, and operators of establishments where such accidents occur should be held to strict account for the same. Safety collars and couplings do not cost any more money than the old-fashioned ones, and it is hard to conceive why their use has not become universal. Some machine shops which have no conception of the progress of times cling stubbornly to old customs, old practices and styles. They absolutely disregard the safety factor in the construction of machinery, and today as well as in former days they will turn out old-type collars and couplings.

"The writer, some years ago, visited a new woodworking establishment in a country town. The machinery, which had been bought from a large manufacturer, was, as far as safety appliances are concerned, in excellent condition, but the shafting overhead was equipped with collars and couplings of the old style, having ugly set screws and bolt ends sticking out. Upon investigation it was ascertained that the owners of the establishment had the collars and couplings made in their own foundry and machine shop. Another instance of careless mechanical construction was found in a small machine shop which builds gasoline engines for use in country grain elevators and on farms. The end of the crankshaft was sticking out beyond the hub of the flywheel more than eight inches. Its edge was sharp, with a keyway on its surface. The surplus end of shaft was of no use, and a source of danger.

"The different labor bureaus and mechanical journals in the United States have for many years maintained an educational campaign with regard to safeguarding machinery, and the claim of ignorance can no longer be an excuse. Manufacturers of unsafe machinery, and machine shops which have no conception of modern safety devices, should be pronounced unfit to take care of our machinery."

Contracts for Eleven Lake Freighters.

The American Shipbuilding Co. has booked orders for 11 more freight steamers which will cost $2,000,000 and, with the nine freighters previously contracted for, will keep the yards busy next winter. Contracts for 10 of the 11 vessels just placed were closed by A. B. Wolvin, of Duluth, who is president of the company that is to develop a special trade is grain and package freight down the St. Lawrence to Quebec. The ten boats will be of Canadian Canal size. They will be 242 feet keel, 43 feet beam and 26 feet deep. They will have triple expansion engines and one Scotch boiler each. It has not been decided at which yards the steamers will be built, but the keels for a few of them will be laid at the West Superior yard and the Chicago yard will also do some of the work. According to the contract, the boats are to be completed and ready for business next May. The other contract was closed by Capt. W. W. Brown, general manager of the United States Transportation Co. The new ship will have a carrying capacity of 5,600 tons on 18 feet. Four of the steamers which Capt. Brown has ordered will be of that class. She will be 400 feet over all, 380 feet keel, 50 feet beam and 28 feet deep. She will have triple expansion engines with cylinders 22, 35 and 58 inches by 40 inches stroke. Steam will be furnished by two Scotch boilers, which will be fitted with the Ellis & Eaves induced draft. The new boat will be built at the South Chicago yard.

The Dover Iron Co., of Bear Spring, Tenn., has leased the Dover furnace at Carlisle, Tenn., and will repair it and place it in operation. The company has already sold the entire output of the Dover and Bear Spring furnaces for the remainder of this year and the entire of next year. Another ore washer is to be installed at Bear Spring and the coke ovens of the LaGrange furnace near Danville, Tenn., will also be operated by this company.

MORE ABOUT OIL GROOVES IN JOURNALS.

In *The Iron Trade Review* for Oct. 17, our contributor, "F. O. Reman" commented freely upon the matter of shaft lubrication. He told of an acquaintance who intended to abandon the grooving of the boxes and mill spiral grooves in the journal, and in this way he proposed to do a quick, clean and convenient job that would be at once pleasant and profitable, the claim being made that work done in this manner would cost less money and that the neatness of the task would add another to the influences that create tone and brighten up the progressive plant. The paragraph continued as follows:

"There is in my friend's plan a likelihood that the spiral grooves will throw the oil along the bearing from one side to the other according to the groove being left or right handed, and in addition to the general application of the oil to the bearing there is the further advantage that the spiral groove cuts down the actual bearing surface only to the amount measured parallel with the axis of the shaft. But, notwithstanding these things, I have doubts whether such a plan will come into general use without straining the conservative sense of the mechanical fitness of things. Let the other fellow try it first."

Our contemporary *Power* commented editorially upon this suggestion, and in a recent issue Wm. Kavanaugh, a contributor, sends that journal the following article descriptive of his personal experience with oil grooves cut in this manner:

"My experience with oil grooves cut in the journals instead of being cut in the boxes or bearings, dates back about fifteen years. At that time I had charge of a large automatic cut-off engine that was belted to a jackshaft from which the power for the building was distributed by means of belts that ran through two sheet iron tunnels and connected with the line shafting of the building. When the engine was first started, the load was light, not exceeding 65 horsepower by the indicator; but, as business increased, the load increased until finally the engine was overloaded to a large extent. The bearings commenced to give warning of this overload, not only the bearings of the jackshaft, but also the main bearings of the engine. More oil was used, compression grease cups were fitted for the bearings of the engine and jackshaft. I applied all the known remedies for hot bearings, using different kinds of grease and grease cups, engine oil and cylinder oil, together with plumbago, none of which gave cool bearings. On the bearings of the jackshaft I resorted to the expedient of having a belt of canvas about 4 inches wide and endless continually passing over the shaft as close as possible to the bearings. The lower portion of the belt was immersed in a pail of cold water, and as the shaft revolved the belt moved over the shaft, carrying with it water from the pail which assisted in keeping the bearings partially cool. This of course was only temporary at best. The outboard bearing of the engine was heating up badly. The caps were not screwed down too tight, the belts had about the same tension; there was no dirt or dust to get into the bearings, as they were all well protected, and the shafting was in line.

"Something radically wrong must be discovered. There was no possible way of lifting the engine shaft out of the boxes, as the shaft weighed over 2 tons and carried a large driving pulley that acted as a flywheel. There was no screwjack or apparatus by which the shaft could be lifted, so I took off the caps of the bearings (the outboard bearing was solid and the inboard bearing, or bearing next the crank, was made with quarter boxes) and noticed, especially on the outboard bearing, that the box was worn in the direction of the pull of the belt. The babbitt acted as a wiper and prevented the oil from penetrating underneath the shaft. I also noticed that the color of the journal was dark blue. Fig. 1 will give an idea of the condition of the babbitt when the caps were removed. The dart shows the direction of pull of belt, the dotted line is concentric with the original circle. It will be seen that the journal wore in the direction of the dart, leaving the babbitt untouched at the point A. Up to this time the thought of grooving the journals had never entered my mind. Now that the caps were off, I determined to effect a cure if possible. I cut away some of the babbitt, as shown at B, Fig. 2, with the aid of a carpenter's chisel, and drove the point of a knife between the babbitt and journal for its entire length.

"The job being done, I replaced the caps and started up as usual making sure that there was plenty of oil feeding into the bearings. After a while I felt of the bearings and found them as hot as ever. Then the idea to groove the journals flashed through my mind as the only possible cure, since it would be a great labor to remove the shaft to groove the boxes. The first holiday myself and my assistant set to work in this way: First, steam enough to rotate the engine was raised, the caps were removed and with the aid of a round-nose cape chisel we set to work to cut spiral grooves in the journals one-half inch from the outside of the boxes, as shown by the lines CD, Fig. 3. If we cut the grooves the full length of the journal the oil would be lost. We cut the channels, as shown, following the form of a spiral as much as possible, turning the engine over when necessary. The depth of the grooves was about 1-16 of an inch and the width about 5-32. The grooves bisected each other, as shown. We used a scraper to remove the burr from the edge of the grooves. Everything being ready, we replaced the caps and started up next morning, making sure of plenty of lubrication; there was no need of being frightened about the oil supply, as the bearings ran and are running to this day as cool as possible, using very little oil. The oil cups for these bearings were fitted with copper rods that rested on the journals and protruded into the cup, acting as a guide for the oil; every time the grooves passed these rods they acted as a small pump, insuring a positive feed and preventing the oil passage from choking up with foreign matter. I was so well pleased that I cut grooves in the jackshaft journals and never experienced any further trouble from heating during my time.

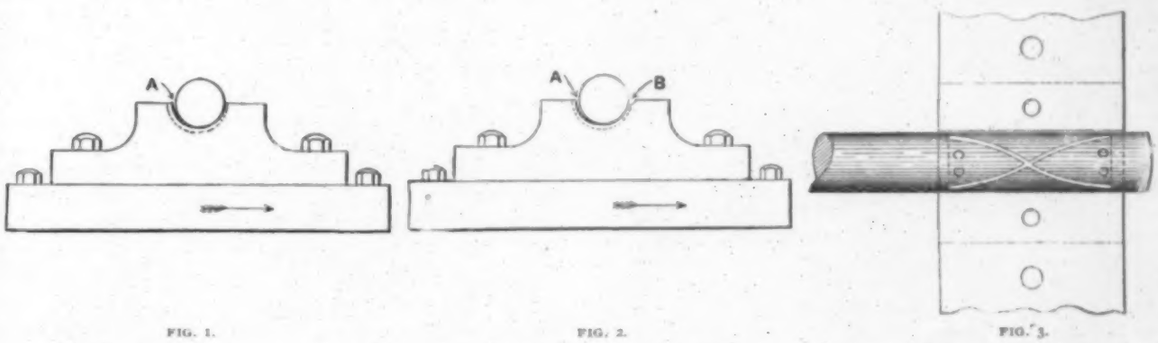


FIG. 1. FIG. 2. FIG. 3.

OIL GROOVES IN JOURNALS.

"Some years after this I took charge of a large electric plant where I had two 250-horsepower high-speed Weston engines that heated badly on their crankpins, requiring a large amount of oil to keep them cool. I applied the groove system very quickly and saved a lot of worry and trouble—not to mention the oil. I told some of my engineer friends about the grooves; one of them declared that this would spoil the engines. Should he ever take the trouble to feel the bearings after running so many years his mind would be disabused.

"It is clear from the above that the grooving in these two cases was not only a great improvement but a decided saving in oil and grease. I should not be surprised to see in years to come engine builders grooving the journals of their engines instead of the boxes, as your article suggested."

THE BAYLDON INTERCHANGEABLE TOOL POST SYSTEM IN LATHE WORK.

The Bayldon system is based upon the turret method where a separate tool is intended for each cut. The method is essentially different, however, from any turret procedure common to the practice of the shops in screw machine work. The present plan allows free use of the tail center, takes cuts as long as the lathe and the follow rest and tail center can assist in supporting work. Facing cuts are easily made by the use of the crossfeed screw after throwing the hinged stop up out of the way. These are opposed to the usual conditions in monitor work and it will be assumed that the Bayldon system is a magazine attachment to the lathe, the attachment furnishing as required a series of tools set to work at definite diameters; and when set in the requisite adjustment the lathe is in position to turn out interchangeable work with a minimum of skilled attendance.

FIG. 1.—THE BAYLDON INTERCHANGEABLE TOOL POSTS AND VISE.

The system comprises a number of tool posts to hold ordinary lathe tools, as well as drills, reamers, counterbores, boring bars and threading dies—in short, stock tools. These tool posts are beveled on the bottom to fit a cam-actuated vise in which they can be quickly placed one after the other and replaced with rapidity and accuracy. This vise is placed on the lathe carriage and is operated by the regular cross-feed screw. On the back of the carriage is a series of adjustable stops for various depths of cut and the vise rests against one of these stops when a tool is first adjusted to the proper position. The illustration shows the multiple arrangement of the stops, they bolt on back of carriage, are hinged so that they turn up out of the way when it is desired to make facing cuts.

The base of the tool posts, as seen in the illustration, is beveled to fit the vise and a cam holds the two parts, post and vise, rigidly together. The vise bolting on the lathe carriage in place of the compound rest, or (in case of the ordinary slide with T-slot for tool post) the top portion can be planed off to afford a seat for vise. The cam wrench for the vise fits on a hexagon shaft in any convenient position and may be at once removed if in the way. The back of the tool post base has an adjustable screw resting against a stop pin in the vise. The intention is to use a separate tool for every cut, the adjustment of the cut being made approximately by placing the cutting tool in tool post while the vise is resting against a stop on the lathe carriage. The accurate adjustments are made by means of the screws and pin in the tool posts and the vise.

The tool posts and holders are made in four patterns as seen in the illustrations, swiveling tool posts of the usual type, rigid cast steel blocks, having adjusting screws underneath the tools, for holding forming tools and others which require unusual stiffness in the holder, boring tool holders for securing boring bars, reamers, drill sockets, chucks, etc., having round shanks and holders of the "bitch dog" type opening to a distance of one inch.

The arrangement does not interfere with the use of taper attachment or follow rest and works equally well on stock held in a chuck or material on the centers. There is no repetition of calipering and no readjustment of screws after they have once been set to the pattern or model piece of work.

The tools are manufactured in two sizes, for 12 to 20 inch and 20 to 28 inch lathes, by the Bayldon Machine & Tool Co., Jersey City, N. J.

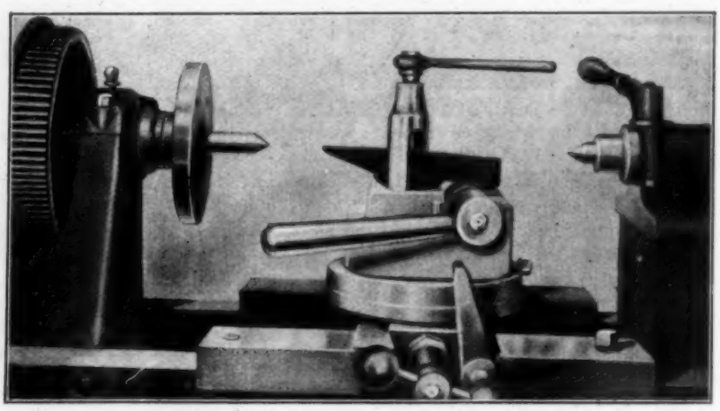


FIG. 2.—VISE AND TOOL POST APPLIED TO LATHE.

The ways and means committee of the National House is considering a new method of allowing drawbacks on imported materials and in the manufacture of products for export. Under existing law the imported materials used in manufacturing any product for exportation have to be identified in some way in the goods exported in order to receive the 99 percent drawback. It is proposed to change the law so that it would not be necessary to identify in the articles exported the material imported, but to provide that where it can be proved that a certain quantity of imported materials were used in manufacturing goods and that a sufficient quantity of the goods exported contained enough of the raw products to account for those imported that the drawback shall be paid. The matter was referred to five members of the committee, Payne, Dalzell, Hopkins, Grosvenor and Russell, to report to the full committee at the next session.

It is estimated that mining machinery which will cost $146,000,000 will be needed in South Africa within five years. There will be a strong demand for agricultural machinery and also for railway equipment. American manufacturers will be an important factor in the competition.

At the annual meeting of the stockholders of the American Car & Foundry Co., Chairman Bixby announced that the working capital could probably be increased by about $3,000,000 by the close of the year. The quarterly statement will show net earnings of over $2,000,000. The following new directors were elected: W. G. Oakman, Thomas H. West, Adolphus Busch and H. R. Duval. The retiring directors were Geo. Hargreaves, L. J. Cox, F. E. Canda and C. R. Woodin. Other directors were re-elected. The directors on organization re-elected retiring officers, except E. F. Carry, who was added to the executive committee. The regular quarterly dividends were declared—that is to say, 1¾ percent on the preferred and ½ percent on the common, payable August 1.

The Harrow Spring Co., Kalamazoo, Mich., is in the market for a standard make second-hand, in-good-condition, water heater capable of supplying a 150-h. p. boiler.

THE DOWN DRAFT FORGE IN MODERN SHOPS.

The forge shop of the Buffalo, Rochester & Pittsburg R. R. at Du Bois, Pa., is a type of numerous shops recently equipped by the Buffalo Forge Co. with down draft forges. The forges are constructed with a hinged hood, which may be adjusted at any angle, or by a special arrangement turned completely over backward out of the way. The smoke and fumes are drawn, by a special exhaust fan, into the hood and down through a system of underground tile piping. The arrangement, by permitting close proximity of hood and fire, insures complete exhaustion of the gases with minimum capacity of apparatus, and consequently with a minimum consumption of power. There are no overhead pipes or hoods in the way of cranes and the view throughout the shop is unobstructed. A track extends throughout the building for convenience in repairing rolling stock. Three cranes serve three large six-foot forges and their accompanying steam hammers. One light forge is used for making and repairing of tools. The remaining nine forges are of a moderately heavy type known as the OD. They have strongly built cast iron frames and are well adapted for all heavy work. The forges are provided with a patent anti-clinker dumping tuyere, which permits of the dumping of all ashes and clinkers without disturbing the fire. The large heating and flange furnaces are supplied with blast from the

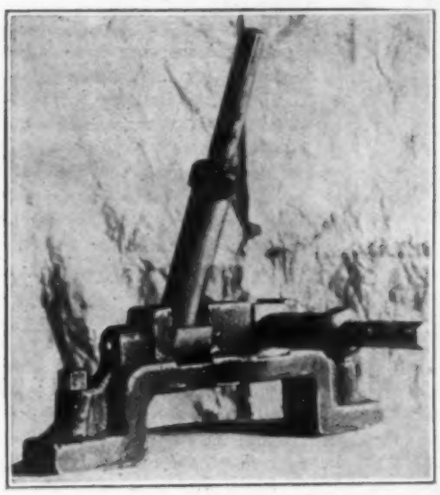


FIG. 3.—MULTIPLE ADJUSTMENT FOR CROSS FEED.

fan system. The blast and exhaust pipe systems are placed parallel in the same trench. They are entirely of tile, laid in Portland cement, placed underground and therefore indestructible. The blast is furnished by a "B" volume blower with a two-foot blast wheel, running at 1,650 revolutions per minute. The exhaust system is furnished with a 70-inch Buffalo exhauster, having a special blast wheel driven at 560 revolutions per minute.

The Empire Steel & Iron Co., New York, has declared a semi-annual dividend of 1½ percent on the preferred stock. Proposed restoration of the old dividend of 6 percent per annum was deferred on account of the strike in the anthracite district causing the closing of a majority of the furnaces of the company.

Wm. H. Staake, trustee in bankruptcy for the estate of C. R. Baird & Co., has presented a petition to the District Court of the United States for the Eastern District of Pennsylvania setting forth that he has received an offer of $25,000 from Drake, Bartow & Co., of Cleveland, for the Roanoke Iron Works. The plant is subject to a vendor's lien for $40,000 (which is also a lien on the Roanoke Furnace Co.), and this has been assigned to the Merchants' National Bank, holder of receiver's certificates, which would be extinguished by the payment of said certificates; also sundry attachments and liens for current taxes. The petitioner believes the offer is full and fair. The funds realized from the sale would probably pay in full all liens and charges and leave a balance for distribution to the creditors of the estate. The trustee therefore asks leave to make the sale. A hearing on the matter was held before Joseph Mason, referee in bankruptcy, 1324-25 Stephen Girard Bldg., Philadelphia, June 30.

AMERICAN STEEL FOUNDRIES CO.

Formal announcement of the organization of the American Steel Foundries Co. under a New Jersey charter with an authorized capital of $40,000,000, half 6 percent cumulative stock and half common, has been made in New York. This company will acquire the plants and properties of the American Steel Castings Co., of New Jersey, Reliance Steel Castings Co., Limited, of Pittsburg, Pa.; Leighton & Howard Steel Co. ,of St. Louis, Mo.; Franklin Steel Castings Co., of Franklin, Pa.; the Sargent Co., of Chicago, Ill., and American Steel Foundry Co., of St. Louis, Mo.

For these properties and for additional cash working capital, $15,500,000 6 percent cumulative preferred stock and $15,000,000 common stock will be issued. The rest of the stock will remain in the treasury for the carrying out of future plans.

The properties were taken over as of July 1, and it is expected the new company will take control not later than July 15. The statement is made that the owners of the constituent companies declined to take any cash in payment for their properties, but instead took stock of the company; therefore the cash requirements have been very considerably reduced, and all have been guaranteed by Messrs. C. M. Schwab, E. H. Gary and Max Pam; for that reason a syndicate has become

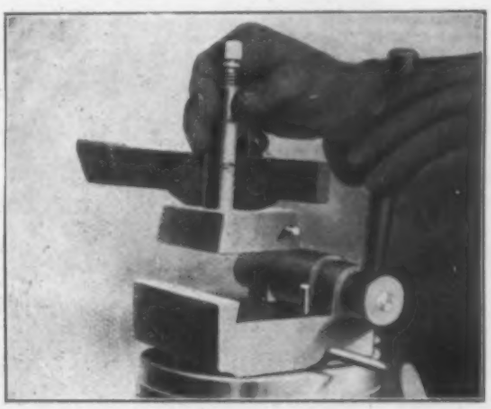


FIG. 4.—WORKMAN IN ACT OF CHANGING TOOL POST.

unnecessary. There will be no underwriting privileges. The American Steel Foundries Co. is a holding company. Ultimately it may become an operating company.

The Old Sterling Iron Mining Co., recently incorporated in New York with head office in New York city, has secured the mineral right formerly owned by the Jefferson Iron Co., comprising the Ward, White, New Dixon, Old Dixon and Old Sterling mines, located near Antwerp, Jefferson county, New York, and is putting them in operation. The mines have not been operated in a number of years and it is necessary to install all new machinery. The mines are under the management of W. J. Jameson, of Buffalo.

The Youngstown Mfg. Co., Youngstown, O., has awarded a contract for the erection of a 10-inch mill and a 16-inch roughing mill to the United Engineering & Foundry Co., of Pittsburg.

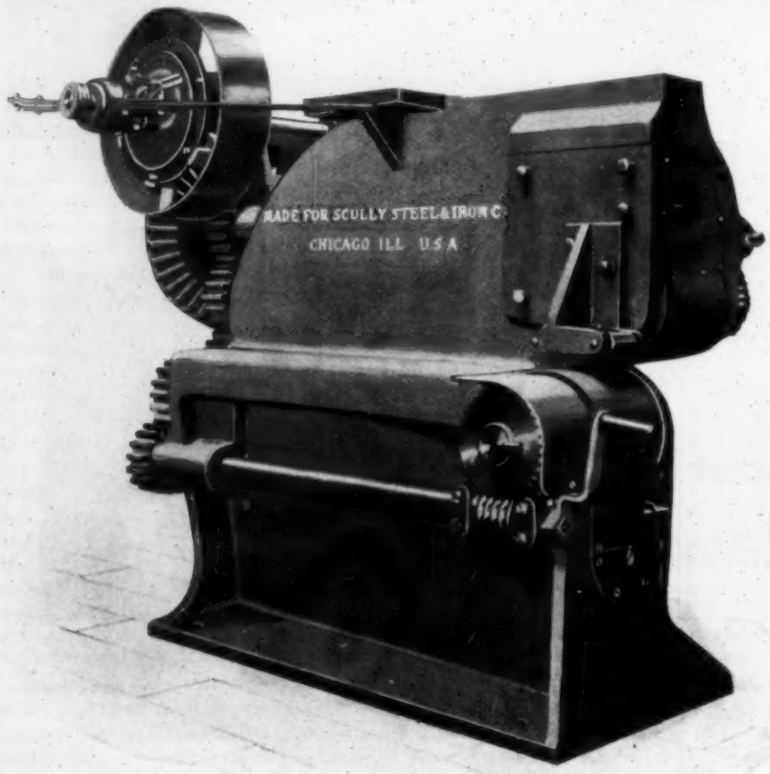
Blast furnace C of the Maryland Steel Co., Sparrows Point, Md., which was recently blown out for repairs was again placed in operation last week. The output has been materially increased by the improvements.

Pipe to equip a placer gold mine in Cape Nome will shortly be shipped from Pittsburg mills. Three freight trains of 30 cars each will be necessary to transport the pipe to the Pacific coast, the order amounting to about 1,800 tons.

KLING ROTARY SPLITTING SHEAR.

Since the October issue, 1900, in which we presented a description and cut of the Kling rotary splitting shear, many improvements have been made on the machine, making it appropriate to refer now to these. In the interval the success of this machine has been demonstrated by actual service in the boiler shop, foundry and structural works. The cutters are run by two horizontal shafts running parallel with the machine, one located in the lower part and the other in the upper part, and arranged in such a way that they do not interfere with the cutting or handling of the plate.

Plates of ¼-inch and lighter of any width or length can be cut at the rate of about 6 feet a minute, and the worm gear and crank arrangement shown in the cut make it possible to adjust the cutters instantly for any thickness of plate up to the capacity of the machine. A guide is provided on the offset side of the machine which keeps strips of metal cut off flat and prevents the weight of cut strips from bending them and from falling away from the machine before they are cut entirely off. The machine will feed itself and is fitted with friction pulley,



KLING ROTARY SPLITTING SHEAR.

when furnished for belt power, but when motor driven, the motor is direct connected to the machine and bolted to a base cast on top of the machine where the crane pad appears on the belt driven machine shown in the illustration. This arrangement of the motor takes no more room than the belt driven machine. The Kling shear is sold exclusively by the Scully Steel & Iron Co., Chicago.

A Catechism on Electrical Practice.

We have received a copy of the "Electrical Catechism" compiled from the regular issues of our contemporary *Power*. The publication contains 533 plain answers to practical questions about electrical apparatus, apparatus of the type found within the average central station or in charge of the isolated plant engineer. No attempt has been made therefore to cover the entire electrical field but a most satisfactory effort at a lucid treatment of such electrical practice and principles of greatest importance to the central station engineer has been made. The author is particularly happy in his treatment of the mathematical side of his subject and conveys his exposition in clean cut, workmanlike language that will be thoroughly appreciated by his practical readers. A goodly portion of the matter contained in the volume has already appeared in serial form in the pages of *Power* and this has been carefully revised to eliminate typographical errors, as well as to bring that part of the work in line with the rest of an up to date production. The book contains 210 6x9 pages with 246 diagrams and other illustrations and an excellent index greatly enhances its value to the busy man. The publishers are the Hill Publishing Co., World Building, New York. The price is $2.

OUTLOOK FOR SOUTH AFRICAN MACHINERY.

That there will be keen rivalry for the trade of South Africa, particularly in machinery lines, now that peace brings the return of the people to agricultural and industrial pursuits, goes without saying. An interesting discussion of the situation appears in the London *Daily Mail* from which Consul Marshal Halstead sends from Birmingham the following extract, indicating that American manufacturers have good prospects in a number of directions:

"The proclamation of peace marks the beginning of what will probably be the most remarkable trade struggle of modern times. For nearly three years, the great export houses of Europe and America have been preparing for this coming battle of commerce. South Africa, devastated, its farms in ruins, and many of its cities almost wildernesses, has to be reconstructed. In the interior of the new dominions, everything will be wanted afresh—from tombstones to cradles, and from bodkins to plows.

"In mining machinery alone, there will be an outlay within five years of probably £30,000,000 ($145,990,000). On the rebuilt farms and in the new cities, fully 100,000 homes will have to be remade within a year. The £3,000,000 ($14,599,000) advanced by the British Government, and the further sums to be loaned by it at low interest are only the beginning of expenditure in this direction. A large credit trade will spring up. Agricultural machinery in particular will be in keen demand. There is certain to be a rapid increase in light railways throughout the Transvaal, making a good market for railroad material of all kinds.

"Where will these orders go? In the case of mining machinery, competition will be very keen. The De Beers Co., a very important factor in the matter, favors America in some ways. Not long since, it sent a special representative to New York, who has been making large purchases there. The Albu group, another important section, favors Germany, representing as they largely do, German interests. Much of their business goes to the Grusonwerk. The Robinson group is generally regarded as inclined to give some orders to America. Then there comes a very important section, headed by the Messrs. Wernher, Beit & Co. and Farrars, which can best be described as militantly British.

German and American Plans.

"German work is seriously to be reckoned with in South Africa, but not so much so in the most profitable fields as America. The Germans in the past have been noted for cheapness rather than quality, although the standard of their wares is steadily improving. The strength of the Americans in the mining field lies partly in the fact that many American mining engineers occupy high posts on the Rand. They, in more cases than one, turned losing into paying properties by their methods, and not unnaturally they favor the products of their own nation.

"An examination of recent contracts shows the great extent to which Americans have already got a hold in South Africa. In mining drills, quite 75 percent of the drills used in South

Africa are of American make, and one company in Easton, Pa., is making a first shipment of 200 tons of drills this month to East London. Two great breweries are now being built in Johannesburg and Cape Town, with everything but the brickwork from America. They cost together between £200,000 and £300,000 ($973,000 and $1,459,000). In the case of the Cape Town brewery, the plans were drawn in New York, a New York house furnishes the necessary structural material, a Cincinnati firm the copper coolers, New York companies the cookers and coolers, a Milwaukee firm the filters, Chicago the brewing machinery, and so on down to terra-cotta fireproofing and wire netting. Even the carpentering work is done by a Staten Island firm.

"In mining machinery, this country may consider itself fortunate if it maintains its former proportions, and obtains orders for one-fourth of the total. In structural steel, for which there is likely to be a considerable field, America seems likely to win. For railways, the greater part of the orders bid fair to go to Belgium and the United States. The Cape Government has strongly shown that for railway material it favors America. The impossibility of obtaining quick delivery from British firms largely accounts for this. As a rule, British houses ask between three or four times as long for delivery as the Americans do. In the rapid development of a revived country, time is everything.

"Last summer Sir Charles Elliott, commissioner for the Cape railways, and the expert high in the confidence of Lord Milner, came north on a special mission of inquiry for his Government. Various rumors were abroad at the time of the commissioner's intentions of placing large orders for new material. His real work, however, was not to place orders, but to find the best-equipped places for executing contracts. He went through the great works of England, continental Europe, and America, and it is no secret that he went away highly impressed with the American equipment. This visit may bear important results within the next few months.

A Preferential Tariff Wanted.

"A demand is certain to arise for a preference for British traders in these new British dominions. Such a preference already obtains in Natal, where it is understood that Government contracts are to given only to English firms, and are, as far as possible, to be made of British raw material. Up to quite recently, it was impossible to get any bulky imports up country, on account of the railways being required for military work. In consequence, large stocks of goods lay at the ports. Much has been done to remedy this during the past few weeks; but the railways will be by no means free for ordinary merchandise for some time yet. Although a very large extension of trade is coming in South Africa, there will, for the next year, be many checks to it, and there will be little opening in the new field except for firms with considerable capital and able to give long credits.

"England has had real advantages over America in the past in the fight for South African trade in the better and cheaper shipping facilities from this country. These may not much longer prevail. Steps are being taken to improve American direct shipping with South Africa, and the British combine, which has for some time had a virtual monopoly of our main trade to the Cape, will soon have its field contested. A new steamer service to South Africa is almost on the eve of birth.

"The immediate expectation of peace undoubtedly had a very favorable influence on the home market, an influence which certainty must increase. Many business houses, especially those connected with our export trades, are launching out in fresh expenditure in view of coming prospects, and orders this week have been especially numerous."

The census reports for 1900 concerning bicycles and tricycles have just been issued and show a capital of $29,783,659 invested in 312 establishments. The value of product is returned at $31,915,908, to produce which involved an outlay of $1,753,235 for salaries of officials, clerks, etc.; $8,189,817 for wages; $2,252,604 for miscellaneous expenses, including rent, taxes, etc.; and $16,702,051 for materials used, mill supplies, freight and fuel.

THE HAWKINS SEMI-AUTOMATIC FRICTION PULLEY.

The Hawkins semi-automatic friction pulley is illustrated in the elevation seen in Fig. 1 and the sectional view shown in Fig. 2. It consists of a flange C, with a leather friction surface, which is made fast to the shaft A. A pulley B with finished ends comes next and is a running fit on the shaft, and at the other end of the pulley is a loose friction flange D. The rotary motion of the flange D in relation to the shaft is limited by cam teeth which engage with similar teeth on the end of a collar E; the collar E being secured to the shaft A. A helical spring S, which is always under tension, has one end made fast to the cam collar and the other end acts against the

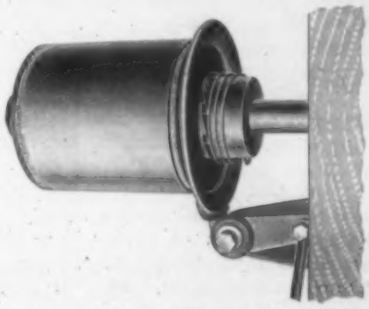


FIG. 1.—THE HAWKINS SEMI-AUTOMATIC FRICTION PULLEY.

loose flange. The tendency of this spring is to rotate the loose friction flange in the direction in which the belt travels. This rotation through the action of the cam teeth sliding on each other pushes the loose flange along the shaft until it strikes the end of the running pulley when the consequent friction rotates it still further until the pulley is clamped between the two friction discs with sufficient force to hold it firmly.

A brake is provided for the releasing of the pulley, which acts on the side of an enlarged circumference of the loose

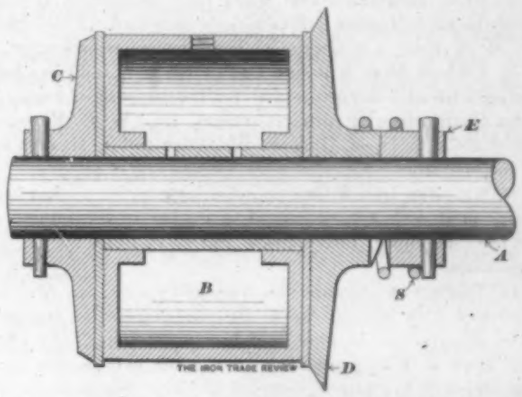


FIG. 2.—SECTIONAL ELEVATION OF THE HAWKINS SEMI-AUTOMATIC FRICTION PULLEY.

flange D and retards the motion of the disc, forcing the cam teeth back into each other and allowing the pulley to run loosely. It will be seen that there can be no slipping of the pulley under load as the pressure of the friction flanges is in proportion to the pull of the belt. The simplicity of this device is a strong point in its favor and the hollow hub B being utilized as an oil chamber the pulley is practically self lubricating.

The description refers to a driven pulley. The device can be made to work as a driving pulley by a slight variation in the construction. This line of friction pulleys is made by the Hawkins Manufacturing Co., of Boston, Mass.

The autumn meeting of the Iron and Steel Institute will be held at Düsseldorf, Germany, Sept. 3-5. In addition to the visits to the Düsseldorf Exhibition, the members will go on excursions to the iron and steel works at Essen, Dortmund, Oberhausen, Ruhrort and Duisburg.

INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

New Buyers in the Market and Some of Their Wants:—

The McLean Mfg. Co. has been organized at Portland, Me., for the purpose of carrying on a general manufacturing and machinists business, with $200,000 capital stock. The officers are: President, H. B. Reiss; treasurer, E. W. Hunt, both of Portland.

The North Chicago Machine Co., Chicago, has been incorporated with a capital of $25,000. The firm will manufacture specialties and the incorporators are: Charles O. Shervey, Harry Bitner and Russell Wiles.

A partnership has been formed between E. C. Oliver and C. B. Warren under the firm name of Warren & Oliver, Alpena, Mich. The firm will conduct the Alpena Iron Works and will later manufacture gasoline engines, etc. Mr. Oliver was formerly instructor in mechanical engineering in the University of Illinois.

The Helm Mfg. Co., Jacksonville, Ill., incorporated for $25,000 with $20,000 paid up, will employ about 35 people and will manufacture all grades of swings, step ladders, etc. Electric power will be used until fall, when steam will be put in. The company is always in the market for ⅜ and ½ inch common black pipe and rod iron.

The Dellenbach Gas Engine Co., of Pittsburg, has been incorporated with a nominal capital of $1,600. A new plant for the manufacture of gas engines is being built.

The Buckeye Stampings Co., Columbus, O., recently organized with $20,000 capital, will make tin cans, tin boxes and metal specialties.

The recently incorporated Foreman Can Co., Irwin, Pa., has purchased a brick building 50x150 feet with 1½ acres of land and will add new buildings as needed. A full line of machinery for making milk cans will be put in.

The Bayldon Machine & Tool Co. was incorporated in New Jersey this week with $10,000 capital, to manufacture machine tools. It is understood that when the organization is completed the capitalization will be largely increased. F. W. Hedden, M. N. Kent, and George F. Fish are the incorporators.

The Elkhart Steel & Range Co., of Elkhart, Ind., has been incorporated with $10,000 capital for the purpose of engaging in the manufacture of furnaces, ranges, etc. W. G. Forward, F. B. VanCamp, H. H. Gray, F. W. Miller and S. Maxson are the incorporators.

The Kingston Iron & Ore Co., of Kingston, N. Y., has been incorporated with $50,000 capital to engage in the mining of iron ore. H. Boice, John DuBois and Z. P. Boice are the incorporators.

The Youngstown Bronze Co., Youngstown, O., has been incorporated with $25,000 capital for the purpose of engaging in the manufacture of brass and bronze castings. The Morrison plant at Youngstown has been taken over by the company and will be entirely remodeled. The incorporators are W. H. McMillen, G. S. Jones, H. Casner, J. W. Long and William Noll.

The Big Savage Firebrick Co., of Cumberland, Md., has been incorporated with $100,000 capital to open coal and clay mines near Mt. Savage, Md.

The Noble & Wood Machine Co., of Hoosick Falls, N. Y., has increased its capital stock from $40,000 to $65,000.

The Coxey Steel Casting Co. and the Coxey Silica Sand Co., Mt. Vernon, O., have been consolidated under the name of the Coxey Steel & Silica Sand Co., with a capital of $500,000. Of this amount $245,000 is in the treasury to be sold to the public at par. J. S. Coxey is the majority stockholder.

The United Steel Co., of Canton, O., will shortly be incorporated with $500,000 capital for the purpose of erecting an open-hearth plant for the purpose of supplying the Carnahan Tin Plate & Sheet Co. and other Canton concerns with steel. J. E. Carnahan, Edward Langenbach, Joseph Biechele, W. W. Irwin and Wm. Blecker will be the incorporators. Victor Beutner, of Pittsburg, has prepared plans for two 35-ton open-hearth furnaces with provisions for two more. A universal plate mill will be installed for rolling ingots and billets into sheet bars. The open-hearth building will be 300x96 feet, plate mill 60x400 feet, gas producer house with 9 gas producers 60x120 feet. The plant is to be completed about March next year.

The D. M. Holmes Mfg. Co., of New York, has been incorporated with $20,000 capital to manufacture machinery. D. M. Holmes, C. Schoppner and Frank Fuller are the incorporators.

The Hall Hammer Co., of New York, has been incorporated in New Jersey with $50,000 capital to manufacture power hammers and tools. A. J. Hall, S. M. Patterson, C. H. Heitzman and James Gerow are the incorporators.

The Blackburn Smith Co., of New York, has been incorporated with $10,000 capital to manufacture iron and steel specialties. W. B. Smith, R. H. Patton and F. L. Patton, Jr., are the incorporators.

The American Iron & Fuel Co., Denver, Colo., has been incorporated with $1,000,000 capital. Richard Price, O. S. Moles and E. Bethel are among the incorporators.

The Wright & Colton Wire Cloth Co., Worcester, Mass., has decided to increase its capital stock from $250,000 to $350,000.

The Colonial Foundry & Machinery Co., of Norwalk, Conn., has been incorporated with $100,000 capital and has taken over the Norwalk Pattern Works, L. J. Wing Mfg. Co. and the foundry of the Aisthorpe & Hatchman Co. The foundry is to be increased to three times its present size while a new machine shop, three stories high, 125 feet long and 40 feet wide, will be built immediately. The main office of the company will be at Norwalk. The company will continue to make a specialty of general castings and will also make a line of stoves and ranges as well as erect engines for stationary and marine work. William M. Brewer has been elected president; L. J. Wing, secretary and treasurer; Charles H. Aisthorpe, manager, and Norman Hatchman, assistant manager.

The Kinsey Mfg. Co., of Dayton, O., has been incorporated with $50,000 capital to manufacture stoves. J. W. Stoddard, C. M. Wood, Isaac Kinsey and C. G. Stoddard are the incorporators.

The Automatic Threading Lathe Co., with principal office at 76 Montgomery street, Jersey City, N. J., has been incorporated with a capital of $200,000 to do a general machine and foundry business.

The Norfolk & Hampton Roads Shipbuilding & Drydock Co. will be organized at Norfolk, Va., July 6. Among the members of the company are: D. Lowenburg, a capitalist of Norfolk; ex-Governor Atkinson, of West Virginia, and Secretary of State Peter Silverman. The company is capitalized at $10,000,000 and has secured options on property in Hampton Roads to be used for an extensive shipbuilding plant. The capital stock has been subscribed, principally by West Virginia capitalists, though promoters from other states are interested.

The United States Charcoal Iron Co., with principal office at 211 Market St., Camden, N. J., has been incorporated. Capital stock, $250,000. The company will manufacture charcoal plates.

The Engineering Co. of America, capital $5,000,000, has been incorporated at Trenton, N. J., to acquire the business of the Cunningham Engineering Co., of Boston. The incorporators are: Millard W. Baldwin, Albert L. Palmer, and Alfred G. Brown.

Fires and Accidents:—

The plant of the Scaife Foundry & Machine Co., Pittsburg, was damaged to the extent of $20,000 by fire this week. The foundry was completely gutted and many valuable patterns were destroyed.

The plant of the Galion Wagon & Gear Co., Galion, O., was destroyed by fire this week; loss, $200,000.

The old Bessemer mill of the Pennsylvania Steel Co., Steelton, Pa., was destroyed by fire last week; loss, $25,000.

The plant of the Royer Wheel Works, Aurora, Ind., was partially destroyed by fire last week, with a loss of $75,000.

The plant of the Miller, Du Brul & Peters Mfg. Co., Cincinnati, was badly damaged by fire June 25. The loss was covered by insurance.

New Construction:—

A $75,000 one-story foundry is to be built by the Magnus

Metal Co., Chicago. The dimensions are to be 100x350 feet.

The Richmond Foundry Co., Belleville, Ill., is building an addition to permit of 15 extra employes. The plant is to be equipped with electric machinery.

The plant of the Griffith's Charcoal Mills, at Washington, Pa., is to be ready early in July. At present a charcoal shed, 32x50 feet is being erected.

Wickes Brothers, machinery manufacturers of Saginaw, Mich., are building a machine shop at West Bergen, N. J., and will employ 60 men. The building is to be a one-story brick structure, 100x400 feet.

The Donovan Wire & Iron Works Co., Toledo, has purchased land on the Pennsylvania-Ann Arbor Belt Ry., and will erect a $30,000 plant.

A new engine house is being built at Fannie furnace of Perkins & Co., at West Middlesex, Pa.

The Colborn Machine Tool Co., Franklin, Pa., expects to have its new buildings completed with machinery installed by the first of September.

The Middletown Machine Co., Middletown, O., will build a two-story addition, 65x250 feet.

The Manitowoc Steam Boiler Works, Manitowoc, Wis., will soon erect a large boiler plant near to the present works.

The Reading Foundry Co., Reading, Pa., will shortly begin the building of a new foundry, machine shop, pattern shop, storage house, power house, office and other buildings.

The Titusville Iron Co., Titusville, Pa., is erecting a new boiler shop, 200x421 feet, of steel and brick. New equipment including three overhead cranes, two hydraulic cranes, a variety of punches and pneumatic tools of different kinds will be put in. The enlarged plant is expected to be running by Jan. 1, 1903.

The Matthews Steel Casting Co., Matthews, Ind., has begun the construction of new buildings. The main building will be 62x300 and the engine room 30x61. The sheds and other buildings will be conveniently located. Natural gas will be the fuel.

P. A. Clum & Co., Rochester, N. Y., brass founders, are erecting a new foundry, 100x329 feet. A traveling crane, an engine and boiler will be put in.

The Central City Brass Co., Syracuse, N. Y., has completed plans for its new foundry. The main building will be 82x30 feet.

A plant for building and repairing locomotives to cost about $300,000 will be erected at Ballard, Washington, by Seattle, Wash., business men.

It is probable that the Leetonia Tool Co., of Leetonia, O., will erect its plant at Sebring, O. The machine shop will be 50x100 feet with a wing 40x50 feet.

The George W. Heartley Machine Co., Toledo, O., will erect its new machine shop on Summit, near Locust St. The building will cost $15,000.

The Cream City Woven Wire Co., Milwaukee, Wis., will erect a four-story plant 152 feet long and 131 feet wide. A boiler house 52x45 feet will also be erected.

The New Britain Machine Co., New Britain, Conn., will erect a four-story machine shop 57x130 feet. An engine house 16x60 feet will also be erected.

The North & Judd Mfg. Co., of New Britain, Conn., will erect a large brass foundry for the manufacture of saddlery fittings.

The Pratt & Whitney Co., Hartford, Conn., will erect a foundry and will make other improvements during the next three or four months that will greatly increase the present output.

Trump Bros. Machine Co., Wilmington, Del., will erect a new machine shop 40x50 feet and an additional erecting shop 32x60 feet.

C. B. Hammett, of Tuscola, Ill., will erect a new machine shop 60x100 feet and a foundry 50x60 feet for the manufacture of gasoline engines. It is intended that the plant be in complete operation by the first of next year.

Ground will shortly be broken at Trenton, N. J., for the erection of the new plant of the J. L. Mott Iron Co. A site of 20 acres has been secured in the lower part of Trenton near the plants of the American Bridge Co. and the Roebling Wire Works. The plant complete will cost about $1,000,000.

The Owen Machine Tool Co., of Springfield, O., has purchased a site on East Pleasant street, that city, and will erect a one-story brick 70x250 feet. The new building will be finished by Oct. 1. The officers are: I. Ward Frey, president; David Snyder, vice president; Edward Harford, secretary and treasurer. Wm. H. Owen is general manager.

The Elkhart Brass Mfg. Co., of Elkhart, Ind., is erecting a two-story building of brick and stone, 162x47 feet. Brass, iron and wooden goods will be manufactured. The company expects to be ready for business by Sept. 1. The officers are: A. E. Hansen, president and manager; W. H. Anderson, secretary, and F. A. Reed, treasurer.

The Wm. E. Pratt Mfg. Co. is erecting a foundry plant at Joliet, Ill. The main building is 360 feet long and with the machine shop, core rooms, etc., the frontage along the C. R. I. & P. R. R. is 800 feet. About 150 men will be employed and the plant will be in operation this month.

Plans have been completed for a new foundry building to be erected by the Central City Brass Co., in Syracuse, N. Y., in connection with the present factory. Cost, $6,000.

The Michigan Fence Post Co., of Capac, Mich., will erect a building 50x120 feet with engine room addition 16x40. The equipment will consist of the usual machinery used in cement construction work, such as concrete mixers, elevators, etc. The company will require machinery for making wire shapes and for making angle iron of hoop steel. It will use considerable quantities of the latter. The company expects to have the plant ready for business by August 1.

The Pittsburg District:—

The Edgar S. Low Co., of Pittsburg, has been incorporated with $50,000 capital for the purpose of continuing the business of Edgar S. Low. Mr. Low has been elected president; W. M. Simmons, secretary, and J. M. Shea, master mechanic. The company deals in new and second hand saddle tank locomotives, railroad and contractors' supplies. The offices are in the Empire Building.

Hyde Bros. & Co. have received a contract for the installation of a boiler plant at the Guelph Iron & Steel Co.'s plant, Guelph, Ont. The company has under erection at present plants calling for more than 5,000 h. p.

The Forter-Miller Engineering Co. has received a contract for several furnaces and eight gas producers to be installed in the new plant of the Susquehanna Iron & Steel Co., Columbia, Pa.

The Pittsburg Steel Foundry Co., Glassport, Pa., has been awarded a contract by the Reading Iron & Steel Co. for 200 large castings, each weighing about 30 tons.

C. H. Bradley & Sons have received a contract from the Sharon Steel Co. for a boiler plant of 4,000 h. p. capacity. The boilers are for the new blast furnace plant to be erected at South Sharon.

The Keystone Valve & Mfg. Co. will erect a two-story plant in the rear of 2626 Carson St., S. S., for the manufacture of valves and fittings. Part of the plant will be fitted up as a brass foundry.

The plant of the Fort Pitt Malleable & Gray Iron Co., McKees Rocks, Pa., was placed in operation several days ago. The foundry is up to date in every particular and has a daily capacity of 75 tons. The main building is 170x400 feet. J. C. Riley is president; M. J. McMahon, vice president; F. J. Lanahan, secretary and treasurer, and John Ryan, foundry superintendent. The main offices are in the Shannon building, Pittsburg.

The Pittsburg Valve & Fittings Co., which was recently incorporated in New Jersey with $300,000 capital completed its organization in this city last week by electing W. D. Hartupee, president, and M. J. Alexander, secretary and treasurer. A site for the plant has been secured at Barberton, O. The company will manufacture its own brass and will make all kinds of fittings. The headquarters of the company will be at Barberton, although Pittsburg capital is largely interested.

The Pressed Steel Car Co. purchased seven acres of ground adjoining its plant in Allegheny last week for $90,000. It is understood that the ground will be used for additions to the Allegheny plant.

The United Engineering & Foundry Co. has been awarded a contract for the erection of a 12-inch scrap mill to be installed in a new rolling mill to be built at Seattle, Wash. The

Lloyd Booth Co., Youngstown, O., will probably erect the mill.

The Hockensmith Wheel & Mine Co., Irwin, Pa., is preparing plans for a new plant to manufacture mine cars and mine supplies. The cost of the new plant is estimated at $75,000.

Several hundred structural iron workers employed by Jones & Laughlins, Ltd,, went on a strike last week on account of the refusal of the company to grant them an advance of 10 percent.

General Industrial Notes:—

Tube mill No. 1 of the Youngstown Iron Sheet & Tube Co., Youngstown, O., was placed in operation last week and worked perfectly. The mill is now producing wrought iron pipe from the company's doubled refined puddle iron. The company now has in operation besides its Alice blast furnace, the sheet bar mill, puddle department, sheet department for the production of New Process galvanized and double refined puddled iron sheets, and the first of the three tube mills. The remaining two mills will be on in about 30 days. W. H. Creahen is superintendent of the tube department.

The Columbus Iron & Steel Co., Columbus, O., will make improvements. Four sets of boilers and a large blowing engine have been contracted for.

At the annual meeting of the Bessemer Limestone Co., of Youngstown, O., officers for the ensuing year were elected as follows: J. G. Butler, Jr., president; Charles M. Crook, formerly secretary and treasurer, was elected general manager, and C. S. Crook, secretary and treasurer.

The Apollo, Pa., plant of the American Sheet Steel Co. is now being dismantled and the machinery that is still available for operation is being removed to the Vandergrift plant. The Apollo mill contained six sheet mills and two 20-ton open-hearth furnaces. Nearly all of the men employed in the plant will secure employment at Vandergrift.

The town of Wheatland, Pa., which has suffered many reverses in the past thirty years owing to the failure of iron and steel projects that located there is again experiencing something of an industrial revival. Several foundries are being built and the continuous operation of the plant of the Continental Iron Co. has brought back many of the workmen who sought employment elsewhere. Under the management of Ephraim Truxall the plant of the Continental Iron Co. is now being operated double turn and many improvements are being made. A three high universal plate mill will be placed in operation the middle of July and a large squeezer is being installed in the puddling department. Four large heating furnaces have also been built and the steam producing capacity has been increased by the addition of four 250-h. p. Cook vertical boilers.

The directors of the Colorado Fuel & Iron Co., Denver, Colo., have decided to suspend payment of dividends on the common stock pending the completion of the present improvements. A 4 percent dividend on the preferred stock will be paid on Aug. 20.

The Penman Steel & Iron Co., which is erecting a large plant at Beaumont, Texas, for the manufacture of steel tanks and oil well supplies, has decided to abandon its East Chicago, Ill., plant as soon as the Texas plant is completed.

The New Castle, Pa., plants of the American Tin Plate Co. closed down last Saturday and will not resume operations until next week. In the meantime necessary repairs will be made.

F. R. Phillips & Sons Co. has commenced shipments on its contracts for tin mills and machinery to the Huntington Tin & Planished Plate Co., of Huntington, W. Va., and the Juniata Steel & Iron Co., Greencastle, Ind. Their contract with the latter company is for the entire equipment of hot mills, tandem cold rolling mills, doubling shears, squaring shears, bar shears, lathe, etc. These and other contracts the F. R. Phillips & Sons Co. have on hand keep the Gruson Iron Works, with which they are interested, very busy.

The Shaw Steel Casting Co., of Milwaukee, has changed its name to the Bay View Steel Casting Co., to avoid confusion with another company.

The new plant of the Youngstown Steel Casting Co., Youngstown, O., will be placed in operation within a few days. The foundry is 300 feet long and 60 feet wide and is equipped with two traveling cranes of 20 tons capacity each. A 15-ton open-hearth furnace has just been completed and room has been left for the erection of another furnace of the same size, should the present furnace prove inadequate. The plant is designed for the production of all kinds of steel castings including rolls. The officers of the company are as follows: E. B. Lawrence, president; T. B. VanAlstine, vice president; W. A. Palmer, secretary and treasurer, and J. W. Rogers, treasurer. The board of directors consists of the above officials together with Harry Parrock, David Rosser, Arthur Eynon, J. W. Long, George Higley and Judge G. E. Rose.

Sensational charges have been made in the suit commenced against George von Spreckelsen, of Milwaukee, Wis., to enjoin him from entering the employ of the West Allis Malleable Iron & Chain Belt Co. This last named company was recently incorporated to make chain belts and the Chain Belt Co., of Milwaukee, seeks to prevent the defendant from being employed by the new concern. In filing its answer to the injunction proceedings the West Allis Co. alleges that according to its belief the Milwaukee concern has realized its enormous profits from a trade combination existing between it and other chain belt concerns, and that prices charged consumers are in excess of what they would be if there were free competition in the trade.

W. E. Taylor, of Youngstown, O., has purchased a controlling interest in the Niles & Scott Wheel Co., Laporte, Ind.

The Whitaker Iron & Steel Co., Wheeling, W. Va., is adding three sheet mills to its plant. When they are installed the plant will have 11 mills in operation.

About 150 laborers employed at the Shenango, McKinley and Red Jacket furnaces of the National Steel Co., New Castle, Pa., are on a strike for an advance in wages from $1.50 for 12 hours' work to $1.65 for 10 hours. The men have also tried to induce the employes of the Rosena furnace at the same place to strike, but without avail. The furnaces have thus far been able to operate with the men who remained at work. The men only recently received an advance in wages of 10 percent.

The Youngstown Iron Sheet & Tube Co., Youngstown, O., last week signed the scale of the Amalgamated Association of Iron Steel and Tin Workers. Owing to the number of improved mills in this plant a special scale had to be arranged to cover the improvements.

Work will shortly be commenced on the erection of a new blast at Joliet, Ill., to take the place of furnace No. 3 at the plant of the Illinois Steel Co. The new furnaces will have double the capacity of the present one.

At the annual meeting of the Bostwick Steel Lath Co., Warren, O., officers for the ensuing year were elected as follows: W. G. Hurlbert, president and treasurer; J. O. Hart, vice president; E. J. Job, secretary. The usual semi-annual dividend of 5 percent was declared.

The William Tod Co., Youngstown, O., has been awarded a contract for two steeple type cross compound blowing engines by the Colorado Fuel & Iron Co., Denver, Col.

Hopkinson Drill Vise.

The Hopkinson drill vise manufactured by the Hopkinson Machine Works, Springfield, Mass., is designed to hold work in the upright drill, for which the manufacturers regard a holding tool as necessary as a chuck on the planer or lathe. A small vise is made by the same company, light enough to handle on the sensitive drill or speed lathe and strong enough to hold a piece of work without slipping. The jaws are 2½ inches wide and 1 inch deep and open 2½ inches. The entire length is 6 inches; weight, 4¼ pounds. A drop forged wrench fitting binding nut and screw is furnished. The larger vise has jaws 5 inches wide and 2 inches deep and opening 6½ inches. The stop pins are hardened and cannot fall out, but by lifting and turning slightly, will stay up so the jaw and follower can be easily moved to the desired position and the pins dropped into place. The holes in base for stop pins are ¾ inch apart and the jaw has 1 inch travel with screw, so it can be quickly adjusted to the work.

The Canonsburg, Pa., plant of the American Tin Plate Co. was closed this week and will shortly be dismantled. The dismantling of this plant is in keeping with the policy of the American Tin Plate Co. to centralize all its plants as far as practicable.

"Of all the equipment installed in our factory, the Cochrane Heater is giving the most satisfaction."

This is the testimony of a prominent Ohio manufacturer who purchased a

COCHRANE FEED-WATER HEATER

over a year ago. With a **Cochrane Heater** you can run your plant with 5% to 20% less fuel (think of the saving!), or increase your steaming capacity in the same proportion, without adding to your present fuel consumption (think of that saving, too!). Besides, a **Cochrane Heater** will give you a material purification of your boiler feed (thus lengthening the life of your boilers), and can be properly cared for and cleaned with the minimum expenditure of time and labor.

Write for Catalogue 11-H.

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STILWELL'S FEED WATER HEATER

USES EXHAUST STEAM TO HEAT AND PURIFY THE WATER FOR YOUR BOILER.

ITS USE INSURES CLEAN BOILERS, GREATER EFFICIENCY AND SMALLER FUEL BILLS.

IF INTERESTED, WRITE

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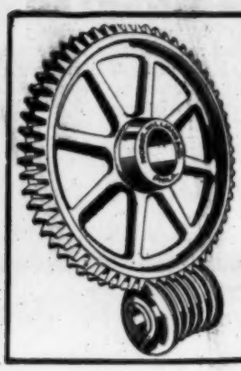

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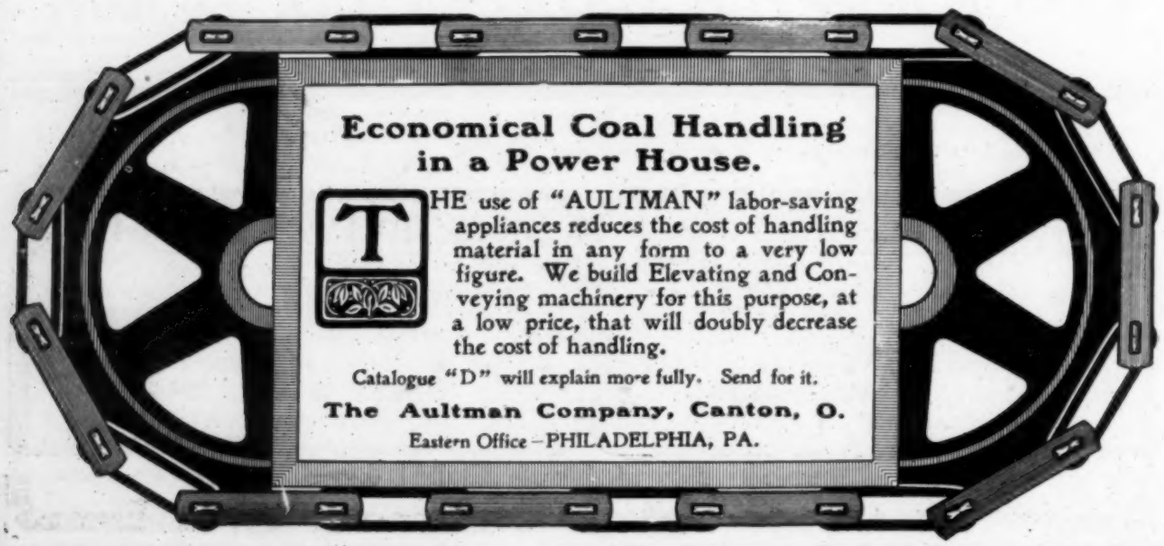

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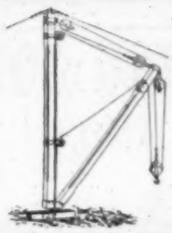

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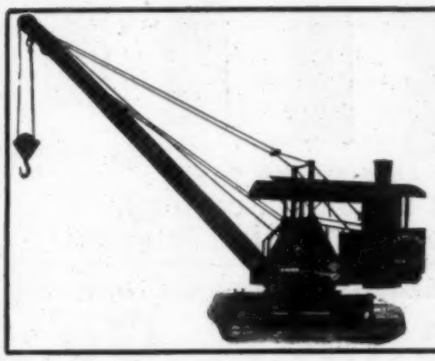

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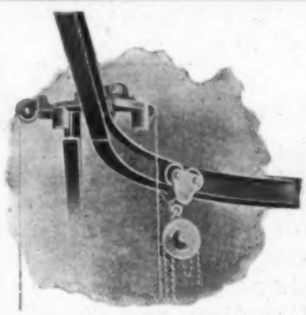

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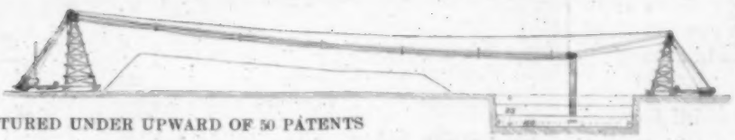

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